ELECTRICAL REVIEW

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22nd October, 1948

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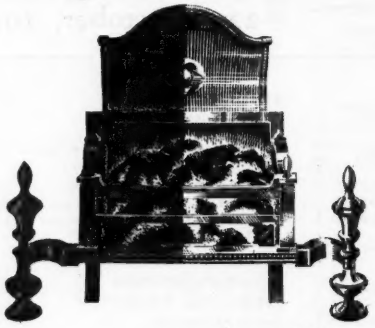

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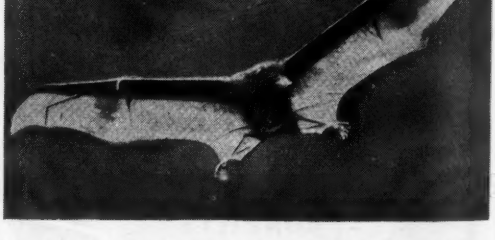

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THE OLDEST ELECTRICAL PAPER

ELECTRICAL REVIEW

ESTABLISHED 1872

Vol. CXLIII. No. 3700
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Boards as Buyers

WHAT MANUFACTURERS WANT TO KNOW

THE shape of the electricity supply service has become much clearer during the few months in which the British Electricity Authority and Area Boards have been at work, but electrical manufacturers and contractors still have much to be told before they can see how they are going to fare under the new regime.

The Boards are very largely autonomous bodies. Nevertheless it is not unreasonable to infer that in many matters they will follow common lines of action and it may not be entirely wrong to reason from the particular to the general: that is to suggest that what one Board proposes may well indicate a policy likely to be adopted by others.

S.E. Board's Policy

Mr. W. R. T. Skinner, deputy chairman of the South Eastern Electricity Board, was careful to tell manufacturers' representatives at a meeting last week (see page 621) that his exposition of his Board's intentions must not be taken to apply to other Boards. In this he was undoubtedly correct for each Board will have its own methods and must be left to declare them itself.

On one subject at least there seems to have been general agreement. Mr. C. F. Wells said at the same meeting that a policy of unrestricted wiring and contracting by the Boards "in friendly rivalry" with private electrical contractors had been decided upon by the B.E.A. In the case of the South Eastern Electricity Board, Mr. Skinner said, this decision was to be followed by an extension of these services to areas now without them. Questions arising between the Boards and contractors were to be dealt with by a B.E.A.-E.C.A. joint committee.

Turning to the supply of electrical equipment, Mr. Skinner expressed his views on "rationalization." Most manufacturers will agree that in the past the personal preferences or prejudices of local engineers have led to too many special designs or variants of stock products. They will welcome a certain measure of relief in this direction, always provided that individual and general development is not retarded by too great a rigidity. Mr. Skinner gave a word of assurance on this point and asked manufacturers particularly to let the Board know if its rationalization proposals seemed likely to harm their export trade.

Decentralization of Purchasing

Purchasing methods naturally formed another important subject for discussion. Mr. Skinner said that in this direction the Board aimed at decentralization and quoted as a proof that this was being achieved the fact that in September only about 1,000 orders were placed by the Board itself, the bulk coming from the lower formations of the Area. Answering the obvious question about the relative values of these orders, Mr. C. Boyles (the chief purchasing officer) showed that the proportion of the value was much the same as the numerical ratio.

This reassured manufacturers as to the value of time and money spent in keeping

in touch with the sub-area and district managers. Mr. Skinner was most anxious that this contact should be maintained and declared that the Board had no intention of choking itself up with the placing of orders.

What manufacturers will want to know is which classes of equipment will be centrally purchased and which bought by the sub-areas and districts. Presumably this will eventually be settled by the Board and communicated to manufacturers through their associations or the trade press. It is to be hoped that the other Boards will be encouraged by the example of the South Eastern Board to divulge what they have in their minds on these and other subjects in which other branches of the electrical industry are vitally concerned.

AN INIQUITOUS TAX

At the Brighton meeting referred to in our leading article Mr. Raymond Berry raised the question of the 100 per cent purchase tax on electric water heaters which, he said, was penalizing electricity in favour of gas. From Lancashire come reports that an Eccles firm has had to give notice to 70 workers who have become redundant largely because of the collapse of the immersion heater market caused by the tax. The assumption of those responsible that water heating is always done on the peak was the main reason for the tax. It is a false assumption and is leading to the decline of a clean, convenient and efficient method of performing an important household service.

ILLUMINATING ENGINEERING

Academically speaking, artificial light can be produced from many sources. Nevertheless scientific illumination, which relies on flexibility in control and positioning of lamps, is so closely associated with electricity that lighting engineers are now almost invariably electrical engineers. Mr. R. O. Ackerley seemed therefore to be on firm ground in claiming, in his chairman's address to the I.E.E. Utilization Section, that experience in illuminating technique should be recognized as a training qualification for corporate membership. Some of the most largely attended Institution meetings have related to subjects in which the purely electrical interest has been secondary. Examples are power stations, electro-medical subjects and the many ancillary matters that provide good discussions before the Utilization Section.

PHYSICAL CONCEPTS

The utilitarian importance to electrical engineers of turning to physics from time to time, whether to refresh their knowledge or to gain an insight into new discoveries, is that theoretical concepts may very quickly become raw material for technical development. An understanding of the "why" is often essential when dealing with the "how" aspects. It is not often that the opportunity comes in so attractive a form as it did in Dr. S. Whitehead's chairman's address (with its practical demonstrations) to the I.E.E. Measurements Section. It is probable, however, that phenomena in the field of materials and measurements as yet accounted for by fundamental research are only a fraction of those yet to be revealed.

GAS TURBINES AND COAL

A disadvantage of the gas turbine for installation in this country is that at the present stage of development it has to rely on oil for its fuel. The use of pulverized coal, however, is more than a mere possibility, although for some time its scope may be restricted. The Institute of Fuel paper reported on page 623 gives an indication of the probable lines of development, one of which is the prospect of efficiently burning high-ash fines in association with an open-cycle combustion chamber with pressure firing, high preheat and excess air. Another opening is the combination of steam and gas turbines, which is expected to entail lower capital expenditure than for gas turbines alone and give quite as high an overall efficiency as that obtained in steam practice.

Commencing with next issue, copies of *Electrical Review* going overseas will be printed on heavier paper and, periodically, additional pages will be included in overseas issues. This has been made possible by a modification of Board of Trade regulations in respect of export copies. These changes cannot apply to copies distributed at home

Aerial view of the Dunlop factory at Speke

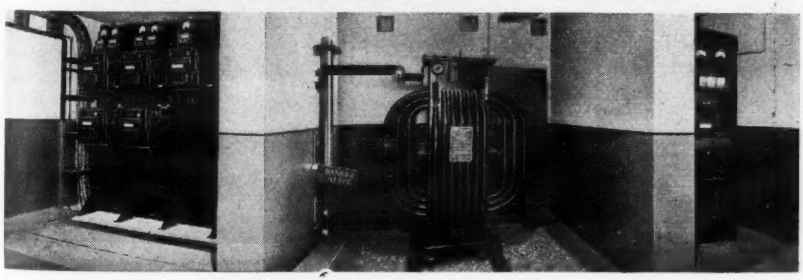
Large Factory Servicing

Notable Example in the Rubber Industry

DURING the past eighteen months or so we have published articles upon the electrical applications to processes carried out in the new factory at Speke of the Dunlop Rubber Co., and to the preparation of the rubber compound, the major raw material used, in a particularly fine example of heavy mixing and milling plant (11th July, 1947). We also published at the outset (23rd May, 1947) a description of the electrical distribution system, showing how this has been modified and expanded from its original form which was designed to meet the requirements of the production of aircraft during the war years, to its present form to meet the peacetime requirements in the production of tubes and tyres, footwear, conveyor belting, golf and tennis balls, etc.

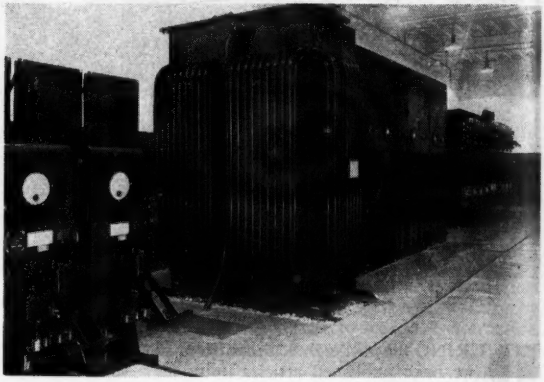
With this background it is now proposed to describe the electrical applications to the factory services—machine driving, lighting, main water supplies, hydraulic power, cooling water, compressed air, steam, space heating and communications. An unusual opportunity is provided here because in few factories are the services so well defined, so distinct from actual production. The factory site area is 101 acres and the buildings have a total floor space of 1·4 million sq ft. In the main factory building, which measures 1,440 ft long by 600 ft wide and has building heights of 20 ft, 30 ft and 40 ft from south

The 11-kV ring mains serve thirteen secondary substations; typical layout



to north, the initial heavy mixing and milling plant has been installed in the 40ft section because of its requirements in regard to headroom, and in consequence the direction of the production flow line throughout this factory building has been reversed.

To deal with the machine-driving service first, there is something like 25,000 h.p. of motors varying in size from 600 h.p. in the case of the drives for the heavy milling machines, down to fractional h.p. motors for driving such equipment as small or very-low-speed conveyors. The factory consumption for production and services is now in the neighbourhood of 25 million kWh per year; generally speaking, however, most of this is for machine driving. The following references to electricity supply which we have "tied" to machine driving relate also to uses outside this section, notably lighting.



Two of the ring-main substations provide d.c. from mercury-arc rectifiers

The demand is met mainly from the public supply by means of four incoming 11-kV services. Two of the feeders terminate in each of two major factory substations which are arranged to afford the maximum flexibility by the installation of busbar couplers and an interconnector between the two substations. One of these substations controls two 5-kV ring mains which supply the heavy mixing plant at the north end of the factory. In the other the two incoming feeders are utilized for splitting up the primary works distribution scheme into three 11-kV ring mains—two for power and one for lighting. The switchboard controlling the ring mains is of the double busbar type and the feeders are arranged for the maximum use to be made of two 875-kVA diesel-alternator sets. As a result of careful load distribution it was possible to generate by this plant nearly four million kWh during 1947, and this was a major contribution to the economies effected during the fuel-shortage period.

The 11-kV ring mains serve thirteen secondary substations housing transformers of capacities from 2,000 kVA down to 300 kVA, and which make available a 400-V

General factory lighting (11 ft-candles) is supplemented where required . . .

three-phase supply to the areas near the substations. Two of these substations in the ring mains are used for making available a d.c. supply by means of mercury-arc rectifiers which serve a three-wire system at 500 V and 250 V. The d.c. is required for variable-speed drives on calenders and extruders.

Four 2,000-gallons-per-hour pumps circulate the cooling water

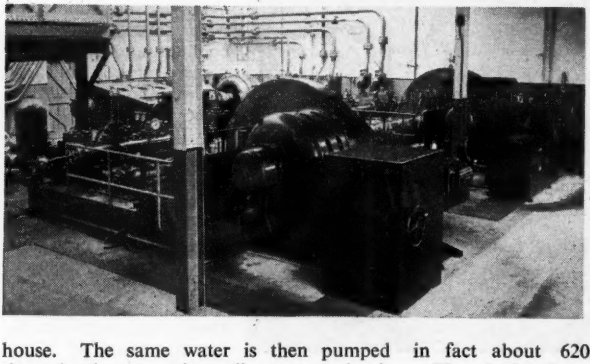
Lighting is probably the next most important service—electrically at any rate. The general lighting intensity throughout the factory at the working plane is of the order of 11 ft-candles. In the 40-ft and 30-ft sections of the factory 400-W mercury-vapour lamps are used in standard industrial-type fittings. Power factor correction condensers are installed with these lamps. The remainder of the factory is provided with general lighting by tungsten lamps in standard industrial fittings. Where higher intensities of lighting are required, such as in laboratories, in the creel which supplies the fabric calender with cotton or rayon, and on footwear-assembly conveyors, 5-ft fluorescent tubes have been installed with excellent results to supplement the general service.

Large quantities of water are required for the cooling and hydraulic-power services and for feeding the boilers. To meet this demand two bore-wells have been sunk on the factory site to produce 75,000 gallons of water per hour. One of these has a pump operating at a depth of 152 ft directly driven by a vertical-spindle 46-h.p. motor. The other has a pump operating at a depth of 140 ft directly driven by a 75-h.p. motor. Both of these motors have contactor equipment and are remotely controlled by push-buttons from a central control board in the main pump house.

A considerable quantity of water is used for cooling the process plant, etc., throughout the factory, and to ensure maximum use the same water is circulated successively through three sections of the process plant. The water is pumped from the bore-wells into a large concrete tank in the main pump house,

. . . by local lighting, e.g. at the creel

whence at its lowest temperature it is first used for the more vital purposes such as cooling the heavy mixing and milling plant. It is returned from the first circulation circuit to a collecting sump from which it is pumped back to a second concrete tank in the pump house. The same water is then pumped through the second cooling-water circuit which includes calenders and extruders, as well as the diesel engines in the power house. After being returned to a third concrete tank in the main pump house the same water is again sent out, this time through a third circuit in which it is used for mould cooling in the autoclaves and for cooling the air compressors.

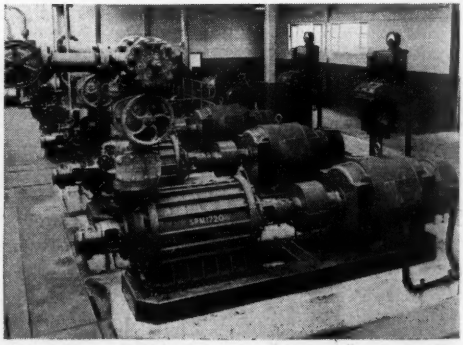


The sources of power for the 1,000 lb per sq in. and 2,000 lb per sq in. hydraulic systems are a 120-g.p.m. (rear) and two 150-g.p.m. three-thrown ram pumps

Four centrifugal pumps, each capable of delivering 2,000 gallons per min, are installed in the main pump house for the circulating operations. One is a stand-by to any of the other three, a system of change-over valves providing for this. Each pump is driven by a 125-h.p., 1,440-r.p.m. slip-ring directly-coupled motor controlled by a manually operated oil-immersed rotor starter. Collecting sump No. 1 has two similar pumps each capable of delivering about 1,700 gallons per minute, one being a stand-by. They are each directly driven by a 105-h.p., 1,440-r.p.m. slip-ring motor controlled by float-operated switches through contactor starting equipment. Similarly for No. 2 collecting sump there is an underground pump house with three 1,000 gallons per min. centrifugal pumps directly driven by a 65-h.p., 1,440-r.p.m. motor, with similar control to that for the motors of No. 1 sump.

Such a system utilizes the maximum cooling capacity of the water, and in so doing keeps to a minimum the initial quantity of water required from the bore-wells. It will be appreciated that to achieve this the total pumping capacity required amounts to more than three times the capacity which is required for the initial water pumping, and is in fact about 620,000 gallons per hour.

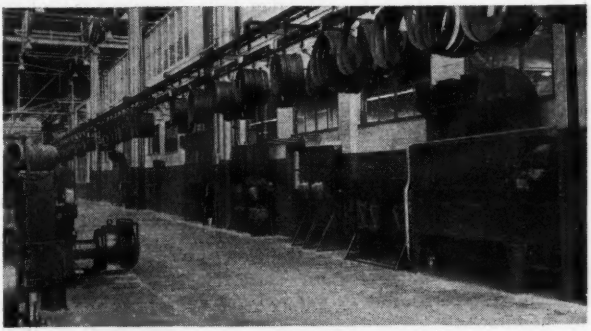
The hydraulic-power service embraces three systems for the variety of presses installed throughout the factory, the pressures for these systems being 350, 1,000 and 2,000 lb per sq in. respectively. All the presses are operated initially, i.e., closed, from the 350-lb per sq in. system which is served by three seven-cell turbine pumps, each delivering 500 gallons per min. and being directly coupled to a 160-h.p., 1,440-r.p.m. slip-ring motor. The 1,000 lb per sq in. system is used for the process operation of cycle-cover, belting and other presses. The source of power is a three-throw ram pump, with a capacity of 120 gallons per min., supplying an accumulator, driven by a 250-h.p., 490-r.p.m. slip-ring



The 350 lb per sq in. hydraulic system is served by three 500-g.p.m. seven-cell turbine pumps; 160-h.p. motors

motor through a 6 to 1 speed-reducing gear.

The heavier presses in the conveyor and precision-components departments and the autoclaves are all served from the 2,000 lb per sq in. system. The power source in this case is two three-throw ram pumps, each with a capacity of 150 gallons per min. In this case too, there is an accumulator in the system. Each pump is driven by a 300-h.p., 600-r.p.m. motor through pinion gearing. All the three-throw pump motors mentioned are served by liquid-resistance rotor starters.



Steam for the h.p. space-heating system is passed through floor-mounted tube units

Two systems contribute towards the compressed-air service. A number of compressor units with a total capacity of about 6,000 cu ft per min at 100 lb per sq in. are installed in one system, while the other system, which provides air in excess of 300 lb per sq in., has a capacity of over 1,000 cu ft per min. The 100 lb per sq in. air is used for all air hoists, for the operation of rams and other devices on the heavy mixing plant, for inflating giant and car tubes during the moulding operation and for use in the vulcanizing pans of footwear-production plant. The driving motors for this variety of compressors range from 75 h.p. to 180 h.p. The high-pressure air is supplied by two compressors. The larger set is driven by a 310-h.p. synchronous motor with p.f. correction characteristics. The motor is supplied from the 5-kV ring-main system. The other compressor is driven by a 180-h.p. slip-ring 400-V motor. Both the air systems incorporate air receivers of large capacity to ensure an even flow of air to the processes.

The steam requirements for tyre and tube moulding and a great variety of steam-heated platens, from units 10 in. square used for small mouldings to the larger platens used on the conveyor belting presses, are considerable. To meet them a boiler house at the south end of the factory has operating in it five two-drum and two single-drum water-tube boilers with a total capacity of 150,000 lb per hour at 200 lb per sq in. With the exception of one stand-by steam-driven feed pump, all the boiler auxiliaries are electrically driven.

There are two systems of space heating in the factory, one served by high-pressure steam, the other by low-pressure steam. At the dispatch end of the factory the heating is provided by the low-pressure system which is supplied with flash steam recovered from the condensate returns from both the h.p. heaters and the production units. Motor-driven fan and coil unit heaters which are suspended from the roof are employed in this system.

From the low-pressure heaters the condensate is discharged into vacuum return mains operating on 14/15 in. of vacuum to a jet condenser of the barometric type. Thence the condensate is pumped back to the boiler house, thus affording the maximum heat recovery.

In both the h.p. and l.p. systems the steam passes through the gilled tubes of the heater, and a motor-driven fan blows the warming air through the nest of tubes.

Other factory services include internal telephone communications for which there is a 300-line private automatic system, and a staff location system operated with a scheme of coloured lamps, with a single and double-flash feature. There are also time-recording and turret clock systems operated by master clocks with low-voltage operating impulses. This system obviates the inconveniences caused by frequency variations on the public supply system.

We are indebted to the Dunlop Rubber Co., Ltd., for permission to visit the factory and to publish this article, and to Mr. D. Crabbe, chief engineer of the Speke factory and his staff for their co-operation.

Views on the News

By REFLECTOR

A LETTER in the *Sheffield Telegraph* complains that not only has the writer (with many others) to pay a higher "unit" charge for his electricity but also a higher rateable value charge (15 per cent instead of 12½ per cent). This is probably a step in the unification of charges. It seems absurd of course that people in different parts of a sub-area should pay different proportions of their rateable value but it need not be. The absurdity lies in the rating system which places vastly different values on similar properties in adjacent districts — for "residential" or "amenity" reasons. This makes rateable value a most unsuitable basis for two-part tariffs as was recognized by the Electricity Commissioners' committee on tariffs in 1930. I shall be interested to see what is recommended by the later committee appointed by the Commissioners to deal with the subject; it is about time that this committee's report appeared.

◆ ◆ ◆

When I was detailing the comparative merits of the agitator and spinner type washing machines the other week I omitted to mention one very important advantage of the former, namely, the ability on certain machines to operate a rotary ironer from the same motor. Simply substituted for the ordinary wringer, this device speeds up ironing very considerably. With a little practice the user can press practically any garment and needs to use the more tedious hand iron for finishing off only such intricate bits as collars, etc. This rotary ironer, like the table ironer, is far too little used yet, but I foresee a most promising future for it as supplies become more readily available to the public.

◆ ◆ ◆

During a "Design Week" at Birmingham, women were asked for suggestions regarding household equipment and some of them dealt with electrical appliances. One or two proposals were made which have been tried out in the past, such as glass doors and electric lighting for electric cookers. I think, however, that there is something in the suggestion that cookers might be mounted on castors and have sufficiently long cables to enable them to be moved out for cleaning. A domestic polisher for furniture was asked for, but an appliance of this sort would require a much heavier and faster motor than the hand vacuum cleaner which seems to have given rise to the idea.

◆ ◆ ◆

London Transport sets a good example to employers in the matter of its employees' education. The staff magazine for September shows how the Executive backs up the L.C.C.'s evening classes. When employees follow approved courses they are eligible for the refund of tuition and examination fees and the cost of books not obtainable from the London Transport Library is refunded on condition that the books are finally handed over to the library. Men are also assisted by the re-arrangement of their duties if necessary and by the repetition of lectures in two consecutive weeks.

◆ ◆ ◆

A statement in *Fuel Efficiency News* for October rather puzzled me. The foreign exchange yielded by 100 tons of coal exported would, it is stated, buy 4,500 tons of butter from Australia. Although large coal is presumably meant (and not the stuff used for generating electricity), the price of the coal must, it seems to me, verge on the extortionate. It may be, of course, that it is the butter that will become plentiful at a fraction of a penny the pound. Research might indicate whether the calorific value of butter at so low a price could not more profitably be used in some cases than the heat units in the coal. The need for economy in the use of 60-volt lamps on peak loads is also mentioned. This voltage surely is only that of a small private generating plant and so the public supply would not be affected by the suggested economy.

◆ ◆ ◆

Last week I referred to the injustice done to England by the illuminations in Edinburgh while London remained unfloodlighted. Now I have to record one on the other side. The *Bulletin and Scots Pictorial* declares that "the financial burden which has suddenly descended on the Scots electricity user has come to us not with the socialization in the electricity industry, but with Londonization."

However this may be, London is at last to have a little light relief in the shape of the Trafalgar Square illuminations.

South Eastern Board's Policy

EXCHANGE OF VIEWS WITH MANUFACTURERS

LAST April, just after Vesting Day, the South Eastern Electricity Board arranged a meeting with manufacturers of electrical equipment, at which questions were invited, to enable the Board to give an outline of its intentions. Some questions remained incompletely answered but now that the Board has been operating for six months or more it has a clearer view of what its policy should be. Accordingly a further meeting was held at Brighton last week when about 200 manufacturers' representatives met Mr. W. R. T. Skinner (deputy chairman of the Board), who presided, Alderman Eric Simms (a member of the Board) and some of the principal officers—Messrs. A. L. Burnell (secretary), C. Boyles (chief purchasing officer), C. F. Wells (chief commercial officer), W. H. Failes (chief accountant), F. Hardman (deputy chief accountant) and W. E. Gibbs (deputy chief engineer).

Recalling the April meeting, Mr. Skinner said that some of the unanswered questions could now be replied to, for the Board's system was as fully organized as were the undertakings which it superseded. No difficulties had been experienced in connection with contracts placed by the former undertakings and not completed by Vesting Day, nor had contracts affecting more than one Area caused any difficulty. Property-plate stocks held by manufacturers for the former undertakings were being used up although they would eventually be replaced.

With regard to wiring and contracting, a B.E.A.-E.C.A. joint committee had been set up to settle matters in dispute and Mr. Wells was a member. The subject of discounts had been settled and the Board had broadly made up its mind to continue to carry on existing contracting business and to extend it to districts which formerly did not have the service.

Rationalization Proposals

Mr. Skinner said that he was a little careful about standardization, or rationalization as he preferred to call it, lest it should cramp development. They intended to reduce the number of cable sizes and of transformers and they were studying the question of switchgear and overhead line equipment. Meter sizes would also receive attention. He said that he would like manufacturers' views on this subject with special reference to the influence of standardization upon export trade. They did not want to carry rationalization to the limit of austerity if it were not going to help the manufacturers as well as the Board.

Although there would be some centralization of purchasing the Board was anxious that as much as possible should be dealt with by the sub-areas and districts. As an indication of what was being done, Mr. Skinner said that in September of a total of 6,500 orders only about 1,000 were placed by the Board itself; headquarters had no intention of choking itself with this business.

They could not yet announce a definite policy with regard to the hire and hire-purchase of apparatus. For the time being they were carrying on existing arrangements but they recognized the benefit of the user having an interest as owner of the equipment and they hoped to get hire-purchase schemes going throughout the Area. The initiation of most schemes lay with the districts, and manufacturers should keep contact with the district managers and their staffs, thus helping the Board to maintain decentralization; they should not always try to go to the highest authority.

Unrestricted Wiring Work

Mr. C. F. Wells said that the B.E.A. had decided upon a policy of unrestricted wiring by the Area Boards and the function of the B.E.A.-E.C.A. joint committees was to report on relationships between the contractors and the Boards. The committee had agreed on a number of points which should help contractors. The Boards would commence, almost immediately, to begin electrical contracting in friendly rivalry with private electrical contractors.

Mr. Skinner then invited questions and was asked how information on standardization as it affected export should be transmitted to the Board. He replied that it might be done through the chief engineer. He told another questioner that he was unable to say how far rationalization would be adopted by the B.E.A. and other Boards.

A meter manufacturer welcomed standardization. He went on to say that his company had been in touch with district engineers but had found that orders had been placed with other manufacturers without those engineers' knowledge. Mr. Skinner thought that meters were a proper subject for centralized buying but manufacturers should still maintain contact with the district engineers who would express their views to headquarters.

Another representative said that it had been stated that some sub-areas had standardized on one particular manufacturer's gear. Mr. Skinner assured him that there was no policy of that sort although a particular *type* of gear might be adopted as a standard. Another speaker suggested that some sub-areas appreciated this but others did not. There was room for "horizontal" rather than "vertical" organization. Mr. Skinner said that the Board wished to encourage "lateral" communication between its sub-areas.

Asked whether the Board was in favour of water heating, Mr. Skinner said that it was if people had properly-lagged tanks and would switch off their heaters during peak periods. Replying to a further inquiry as to whether consumers would be permitted to install water heaters if they obeyed the rules, Mr. Skinner said that only lack of materials and the question of "priority" stood in the way. Mr. Wells said he was in favour of a reduced purchase tax on electric water heaters as they were now penalized in favour of gas heaters.

On the subject of lighting Mr. Skinner said that it was intended to convert all systems to the standard 240 V in time and manufacturers should take account of possible fluctuations. Mr. Wells said that there was no standard practice with regard to the maintenance of lighting systems—sometimes it was done by the local authorities and sometimes for them by the Board.

It was pointed out that export trade was dependent on a basic home market and the speaker welcomed the initiation of a reduction of types of appliances by the largest buyers. Mr. Skinner asked whether overseas customers could be induced to take a smaller range and the speaker said he thought they could if it meant better delivery.

Mr. Skinner, answering another question, said that he hoped in due course to acquaint manufacturers with the Board's ideas on rationalization through their various associations. Cables were already being dealt with in this way and possibly transformers would be next to be handled.

Replying to a request for the relative values of orders placed by the Board and by the sub-areas and districts, Mr. Boyles said that the Board's orders probably represented from 10 to 15 per cent of the total value.

Alderman Simms in thanking the manufacturers for attending the meeting and affording guidance to the Board, stressed the value of contact with the district managers. Sir John Dalton (director, Cable Makers' Association) replied on behalf of the manufacturers and the meeting closed.

Structure of Materials

DR. WHITEHEAD'S ADDRESS

SOME physical concepts in relation to the properties of materials and their measurement were explained with the aid of demonstrations by Dr. S. Whitehead (director, E.R.A.) in his address as chairman of the Measurements Section of the Institution of Electrical Engineers last week.

Commencing with the wave properties of particles, Dr. Whitehead explained why the particle concept, which was the theory of the electron gas in metals, had failed after an early apparent success. As a wave, however, the electron can pass through an ordered structure without scattering; but not through a disordered structure so, at very low temperatures, a pure metal has little resistance. Rising temperature stimulates natural oscillations, which constitute heat; they also form waves which interfere with the electron waves, exchanging energy in accordance with the quantum theory.

Electrons gain electrical energy by drifting along the electric field so, in equilibrium, they pass it on to the thermal vibrations, equivalent to the heating of solids by resistance losses. Thus the experimental laws of electrical and thermal conductivity can be explained fairly accurately.

Alloys of the solid-solution type have dissimilar atoms at corresponding points; that essential disorder causes resistance, but there is inherent difficulty in making a high resistance with a low temperature coefficient.

Dr. Whitehead next idealized the physicists' potential barrier, or "well," to explain how electrons (as particles) can bounce back and forth and (as waves) can be reflected, just as a standing wave is produced on a transmission line between complete short circuits. If the potential barrier is too "thin," disturbance can be transmitted through it as some energy passes through an imperfect short circuit because the latter is incompletely resistive. The same thing happens with barriers binding electrons in dielectrics. If the barrier is only some millivolts, electrons with enough thermal energy can jump it at ordinary temperatures. Thus electronic semi-conductors are insulators when there is too little thermal energy (at low temperatures) to escape whereas they become conductors at the higher temperatures. Dielectrics usually break down in practice, except under impulse tests, at much lower working stresses for other purposes.

According to the activation principle, ions in a potential "well" can pass over or cross a barrier as in chemical reactions, thus accounting for plasticity by breakdown of cohesion of two molecules and re-forming elsewhere. It also partly explains why moisture can be absorbed in varnish and pass from one trapping hole to another in diffusing to a paper base, ion drift being in the direction of the electric field applied to a series of "wells" corresponding to a row of molecules.

Then there are co-operation phenomena, the best known electrically being in magnetic material, which is made up of domains of minimum size and sub-domain particles. Each domain had a number of magnetons (elementary magnets) tending to align themselves parallel

to each other. There seemed to be organizing energy tending to arrange them against the disordering effect of thermal motion; orientation spreads until stopped by a barrier, such as a strained portion, or an impurity, while rising temperature diminished order (ferromagnetism) to disorder (paramagnetism). Similar effects with dipoles in dielectrics are less familiar and have evoked the curious neologism of " ferro-electricity "; the term " para-electricity " is not used in ordinary dipole theory.

In dramatic opposition, the dipole in some materials seemed to be induced by the distorting effect of the field itself, by ion " rattling " within the crystal cell. Despite the unfortunate mechanical properties of such materials and their dependence on temperature, their impact on means of measurement may be revolutionary.

Coal-Fired Gas Turbines

A PAPER presented before the Institute of Fuel last Tuesday by Messrs. F. B. Karthauser, W. V. Battcock and F. F. Ross discussed gas-turbine cycles to which coal firing could be economically applied. The conclusions reached are that while such turbines would cost more and be less efficient than corresponding units using distillate oils, they should have a limited field of economic application, especially where steam can be generated from the exhaust gases or where a gas turbine is an auxiliary to steam plant. Deposits in the turbines may not be preventable but can be washed off and their formation minimized by choice of coal and combustion conditions.

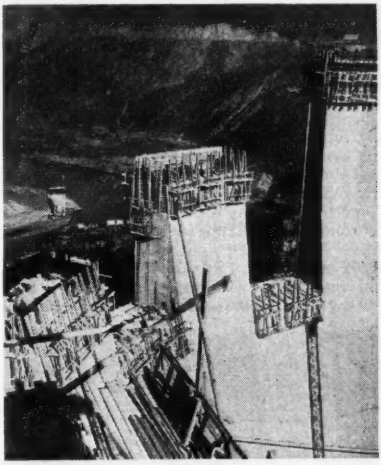
Compared with an oil-fired plant incorporating a heat exchanger but no intercooler, the efficiency of a coal-fired plant would be 20 per cent instead of 25 per cent on account of heat losses due to unburnt carbon and additional radiation; pressure losses in gas cleaning equipment, combustion chamber, longer pipes and larger heat exchanger; and losses in coal handling in preparation and in ash removal. The relatively low efficiency of the coal-fired gas turbine is likely to limit its use for decentralized power generation to cases where waste heat is available. The combination with a waste heat boiler gives a more flexible power-steam ratio than does a back-pressure steam turbine, though overall thermal efficiency is not so high.

Brief particulars and circuit diagrams are given of three cycles in which combustion products are not passed through the turbine, but these are economic only in sizes too large for decentralized generation. These cycles are the aerodynamic (or closed), the Karrer and the indirectly heated open cycle with multistage intercooling and reheating. The first and last have been previously described in the *Electrical Review*. In the Karrer cycle the exhaust gases from a gas turbine are used as combustion air for a steam plant, the heat being put into the gas cycle by a high-temperature air-heater in the passes of the boiler.

French Hydro-Electric Developments

WORK on the construction of the Castillon Barrage on the River Verdon in the Lower Alps, which was originally started in 1929 and interrupted, has now been resumed. The reservoir extends over 490 hectares (1,180 acres) and has a capacity of 33,000 million gal. (150 million cu metres). The Verdon will supply an average of 450 million cu metres (98,000 million gal.) annually, the basin measuring 675 sq km (1,080 sq miles), but the most important contribution will be from melting snow from April to June.

At the foot of the barrage a 50,000-kW power station is to be constructed, which will produce annually about 80 million kWh. It will contain



Castillon Barrage under construction

four vertical-axis 300-r.p.m. Francis turbines operating on a flow of 18 cu m per sec (14 million gal. per hr), the net fall varying between 89 and 50 m (290 and 165 ft), with a maximum guaranteed output of 89·5 per cent. The alternators are rated at 17,000 kVA and 25 cycles and the voltage of generation (10 kV) will be stepped up to 130 kV by banks of single-phase transformers.

I.E.E. Students' Dance

THE London Students' Section of the Institution of Electrical Engineers is holding an informal dance on 30th October at Victoria Hall, Bloomsbury Square, London, W.C.1. (Tickets, 4s. single, 7s. 6d. double) can be obtained from Mr. E. L. Hawley, hon. assistant secretary (entertainments), 39, Highfield Avenue, Kingsbury, London, N.W.9.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE National Coal Board has appointed **Sir Guy Nott-Bower,** K.B.E., C.B., to be director of public relations. Sir Guy is a deputy secretary of the Ministry of Fuel and Power and has been released from his present duties with the consent of the Minister. He will take up his duties with the Board on 1st November.

Dr. R. L. Smith-Rose, Director of Radio Research at the National Physical Laboratory, Teddington, left this country for Stockholm this week, to lecture in connection with the exhibition of radio products, which opened there on 18th October. The visit has been arranged by the British Council in collaboration with the Radio Component Manufacturers' Federation. Dr. Smith-Rose will lecture on the principles of radar and radio navigational aids, and on radio and electronic techniques.

Mr. H. W. Adams, manager of the Export Department of the General Electric Co., Ltd., has retired after thirty-eight years' service with the company. Mr. Adams joined the G.E.C. in February, 1910, as an export traveller. He transferred to the Government and Railways Department during the 1914-18 war, afterwards returning to the Export Sales Department, with which he remained until 1928 when he toured the East, Middle East and South Africa. On his return he was appointed Export Sales Manager. Subsequent tours took him to

Mr. L. Gamage presenting a silver rose bowl to Mr. H. W. Adams on his retirement

Buenos Aires, the West Indies and Central America. In April, 1946, he was appointed manager of the Export Department. The occasion of Mr. Adams' retirement was marked by a dinner at Claridge's on 28th September, given by Mr. Leslie Gamage to all members of Export Department and to those of the G.E.C. Overseas Organization now in England. Among the presentations made were a refrigerator, silver cigarette case, silver rose bowl, camphor wood chest, nest of tables, table lamp with a shade signed by the staff of the Export Department, and a handbag for Mrs. Adams.

Mr. D. G. W. Acworth, M.A., M.I.E.E., has been appointed manager of the Export Department, in succession to Mr. Adams.

Mr. W. F. Baker, B.SC., A.M.I.E.E., manager of the General Switchgear Development Department of the G.E.C. Laboratories, Witton, has left the service of the General Electric Co. to take up an appointment as chief electrical engineer to W. Canning & Co., Ltd., Birmingham. At a farewell gathering Mr. Baker was presented by his G.E.C. colleagues with a photographic enlarger.

Mr. W. F. Baker

Mr. T. H. Y. Bonsey, D.F.H., A.M.I.E.E., of the British Aluminium Co., Ltd., who was seconded to the Control Commission for Germany in 1945 and was appointed chief control officer in the Metallurgy Non-Ferrous Division, has relinquished his appointment in order to become sales manager to the Aluminium Wire & Cable Co., Ltd., of Swansea and London. **Mr. C. H. E. Ridpath,** B.SC., A.M.I.E.E., A.M.I.MECH.E., who has been in charge of the British Aluminium Co.'s Electrical Sales Development Section for a number of years, has also joined the new company as deputy sales manager.

Mr. J. L. W. Cole, who has been appointed resident electrical engineer to the Iraq Petroleum Co., Ltd. (Middle East Areas), is a native of Amble (Northumberland). He was educated at Rutherford Technical College, Newcastle, and was chief electrical engineer with the Sierra Leone Development Co., Ltd., at Freetown until 1942 when he returned to England to join the Air Ministry Works Directorate in Lincolnshire. Mr. Cole will leave England at the end of the year.

Mr. E. G. Phillips, whose appointment as chairman of the North Midland Regional Fuel Efficiency Committee was recently terminated by the Minister of Fuel and Power, asked the Association of Consulting Engineers of which he is a member to inquire whether he had been guilty of a breach of professional etiquette as might be conveyed by the Minister's action. The Association last week issued a statement to the effect that it was not aware of any accusation

against **Mr. Phillips's** professional integrity and that it has been specifically informed that there was no foundation whatever for suggesting that there had been any reflection on his integrity. The *Manchester Guardian* reports that Mr. Phillips intends to have the matter raised in the House of Commons.

In consequence of the latent effects of wounds received in the 1914-18 war, **Mr. L. Franks,** F.C.I.S., formerly secretary to the North Somerset Electric Supply Co., Ltd., etc., has left the industry and is sailing in the *Queen Elizabeth* to the United States *en route* to New Zealand.

Mr. H. F. Murray, previously consumers' and sales engineer with Dumfries County Council Electricity Department, has been appointed section head, consumers' service, with the South West Scotland Electricity Board.

Mr. E. A. Flint, A.M.I.E.E., consumers' engineer of the Eastern Electricity Board for Finchley District, has been appointed consumers' engineer for the Kingston, Surbiton and Walton District of the South Eastern Electricity Board. Mr. Flint will take up his new duties on 1st November.

Mr. M. I. Barstow, transmission engineer, Eastern Division, B.E.A., resigned on 30th September last, in order to take up farming in the Bedford district. He has been succeeded by **Mr. A. W. Sweetinburgh** who was previously senior assistant transmission engineer.

Tube Investments, Ltd., announce the following executive appointments by their subsidiary the Simplex Electric Co., Ltd.:—**Mr. E. G. Plucknett** is appointed a director of the company, responsible for sales policy and commercial organization. **Mr. W. Foster,** northern area manager, is appointed to replace Mr. Plucknett as general sales manager, Creda division.

Mr. E. G. Plucknett

Mr. Foster will, in future, be situated at the Simplex Company's head office at Oldbury.

Professor A. D. Ross has been nominated president-elect of the Illuminating Engineering Society of Australia for 1949.

Dr. P. F. Soper, M.I.E.E., head of the Electrical Engineering Department of Doncaster Technical College, is leaving Doncaster in January to take up a similar post at the new Technical College at Nottingham.

Lord Citrine recently paid a visit to the Prescot works of British Insulated Callender's Cables, Ltd., during which he inspected the various processes of cable manufacture. In the accompanying picture he is shown with Mr. W. H. McFadzean (deputy chairman of B.I. Callender's), Mr. F. Waine (director) and Mr. J. L. Harvey (manager, production), witnessing the lead covering of a super tension cable.

Lord Citrine at the Prescot works of B.I. Callender's Cables, Ltd.

Mr. W. Gilchrist, A.M.I.E.E., late assistant commercial manager, Central London Electricity, Ltd., has been appointed chief commercial officer to the Merseyside and North Wales Electricity Board.

Dr. H. J. Denham, C.B.E., M.A., has been re-appointed a member of the Ordnance Board and head of the Electronics Division on his release from the Army. Dr. Denham became a member of the Board with the rank of colonel in 1944 and was awarded the C.B.E.(MIL.) in 1946.

Mr. L. Maynard has been appointed to the board of the Supra Electrical Co., Ltd., as sales director.

Mr. J. A. Brazier, a former member of the staff of Pooley & Austin, Ltd., has been elected a director of the company.

Mr. W. H. Taylor recently retired from the position of general manager of the Western Australia State Electricity Commission.

The Birmingham Area Branch of the **Electrical Industries Benevolent Association** held a luncheon on 14th October at the Midland Hotel, Birmingham, over which the chairman, Mr. F. W. Lawton, presided. The chief speaker was Mr. A. G. Beaver, president of the Association, who emphasized the great care exercised in the help given to needy persons and also the necessity of getting everyone interested in the

activities of the Association. He thought that more help would be needed in the future by persons occupied in the electrical industry. A collection taken at the luncheon realized £59. The annual general meeting took place after the luncheon and the following officers were elected:—Mr. F. W. Lawton (president of the Branch), Mr. J. C. Clement (chairman of Executive Committee), Mr. L. Wall (hon. secretary—re-elected). c/o Electrical Components, Ltd., 102, Snow Hill, Birmingham, 4. Mr. H. Senior Fothergill (secretary, E.I.B.A.), addressed the meeting.

We regret that there was some confusion of the events in our last week's report of the Electrical Industries National Golf Championship. The winner of the Sir Montague Hughman trophy was **Mr. W. Murfin,** with **Mr. F. W. Dewhurst** as runner-up, while **Mr. L. R. John** won the best scratch score trophy. The silver tankard presented by Sir John Dalton was won by **Mr. J. A. Dixon.**

The **G.E.C. Dramatic Society** presented "The Man Who Came to Dinner" at the Fortune Theatre, London, on Monday and Tuesday last. The pre-war productions of the Society attained a high standard and despite the intervening years and the wartime difficulties the latest production indicates that there has been no falling-off in that standard. The title rôle was played by William Peacock who got through a long and difficult part with polish and assurance. He was ably supported by a long cast of which particular mention must be made of Moira Threlfell, Patricia Parkes and the all too short appearance of Austin Mooney. The whole production went with a smoothness indicative of careful rehearsing. As in the past the proceeds are to be passed on to the Electrical Industries Benevolent Association and a full house on each night assured that a good sum will be handed over.

Obituary

Mr. Samuel Rose, whose death occurred on 13th October in his fifty-sixth year, was a director of the Wholesale Fittings Co., Ltd., for over twenty-five years. The funeral at Willesden cemetery was attended by a large number of friends in the electrical and radio trades. Mr. Rose leaves a widow and two sons, both of whom are engaged in the business.

Alderman Harry Varley, chairman of the Chesterfield Electricity Committee for twenty-one years, died recently.

WILLS.—Mr. N. A. Enticknap, joint secretary of the General Electric Co., Ltd., who died on 9th May, left £18,052 gross (£17,834 net).

Mr. T. C. D. Poynter, late director of the Charing Cross Electric Lighting Co., who died on 28th February, left £6,361 gross (£6,242 net).

Mr. H. A. Beal, electrical engineer, South Harrow, who died on 30th April last, left £12,396 gross (£12,285 net).

Power Costs

A LUNCHEON was given in Edinburgh on 15th October on the occasion of the meeting in the city of the British Electricity Authority and the chairmen of the fourteen Area Boards, as well as the Electrical Development Association. Lord Provost Andrew H. A. Murray presided.

Lord Citrine, chairman of the B.E.A., said he visited Portobello station that morning, and could quite understand how proud they were of that station. It was exceptionally well designed, and he thought that with the new unit, which was now going in, it would be one of the most efficient in the country. He had gathered that when the extension took place in 1939 it was regarded as final, but when he told them that it was now contemplated that the station would be anything from three to four times as large as it was in 1939, they could see the difference in outlook.

Speaking of increased costs, he said he sometimes thought these were not entirely appreciated. For a new station they were paying to-day anything from £50 to £53 per kW of installed capacity. Portobello station was built for £17·89 per kW, so that they were now paying three times as much for a station as they did for Portobello in 1939. Although the new 60,000-kW set, because of the ingenuity of engineers and designers, was going to be built at a lower cost than that, it would still cost £35 per kW. He also referred to the increases in operating costs and said that something like 150 undertakings were running at a loss at the time they were taken over, the aggregate amount being between five and seven million pounds, and they were budgeting for increases at the time of transfer.

In a note issued subsequently by the British Electricity Authority to correct a misreporting in the Press of Lord Citrine's address it was stated that the Authority did not anticipate that it would make a loss this year.

High-Vacuum Methods

A CONVENTION on high-vacuum methods in industry held at Gleneagles Hotel was presided over by Sir Charles G. Darwin. Technical papers were read and discussed and the uses of vacuum methods during the past thirty-five years were reviewed by Dr. Saul Dushman, assistant director of research to the General Electric Company at Schenectady, New York. He recalled that the discovery of the electron had been followed not only by a series of brilliant investigations on the structure of the atom, but also by others on the nature of the conduction of electricity in gases at low pressure and in extremely high vacua. The convention was arranged by British American Research, Ltd., and sponsored by the Society of Chemical Industry.

His Majesty the King, accompanied by the Queen, is to open the new power station at Kingston-upon-Thames on Wednesday next, 27th October. This aerial photograph of the station was taken exclusively for the *Electrical Review* on Monday last.

Census of Production

RADIO AND TELECOMMUNICATIONS APPARATUS

THE *Board of Trade Journal* for 16th October contains details of production of firms and Government Departments engaged wholly or mainly in the manufacture of radio apparatus, telegraph and telephone equipment, electric lamps and gramophones. The inclusion of electric lamps in this group of industries is apparently because of their association with radio valve production.

Included in the total value of production are sales of other goods made by the same firms to the value of £14,282,000. These products cover a wide range, including wires and cables, domestic appliances, X-ray apparatus, machinery and plant and accumulators.

TABLE I.—PRIVATE FIRMS—GENERAL SUMMARY

	1946	1937
	£'000	£'000
Value of production (gross output)	74,724	36,314
Materials, fuel and electricity used	32,140	16,204
Amount paid for work given out	642	61
Net output	41,942	20,049
	No.	No.
Average number of persons employed	118,497	81,383
	£	£
Net output per person employed	354	246

TABLE II.—GOVERNMENT DEPARTMENTS—GENERAL SUMMARY

	1946-7	1935-6
	£'000	£'000
Value of production (gross output)	35,045	11,950
Materials, fuel and electricity used	6,397	3,417
Amount paid for work given out	12	7
Net output	28,636	8,526
	No.	No.
Average number of persons employed	64,996	36,192
	£	£
Net output per person employed	441	236

For private firms the overall figures are summarized in Table I, and Table II shows similar overall figures for Government Departments.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Charges to Belfast Consumers

I HAVE read with interest the paragraph in "Views on the News" concerning the practice in the Belfast undertaking of charging consumers where it has been discovered on inspection by the undertaking that contractors' work does not come up to standard.

I do not know if the law in Northern Ireland is the same as the law in this country, but if it is I would be interested to know what course the undertaking adopts if the consumer refuses to pay the charge, since, as I see it, there is no obligation upon him to pay.

If, on the other hand, the law is different I think this should have been made clear since the paragraph as it stands appears to recommend an irregular course of action.

*London, W.*13. D. G. MILLINGTON.

Invidious Distinction

AS a chartered electrical engineer I have often attested the suitability of an applicant for the protection and assistance abroad that is afforded by a passport. The Foreign Secretary has invariably accepted my advice. Some Government Departments are more particular and do not accept membership of the Institution of Electrical Engineers as sufficient warrant even for witnessing a signature.

If I had happened to be a policeman and had risen to the rank of sergeant, I could have helped recently to complete an official form in this way. All I could do was to suggest scraping acquaintance with the proprietor of a small general shop round the corner who possessed the requisite qualification as an authorized dispenser of stamps and postal orders. DEFLATED.

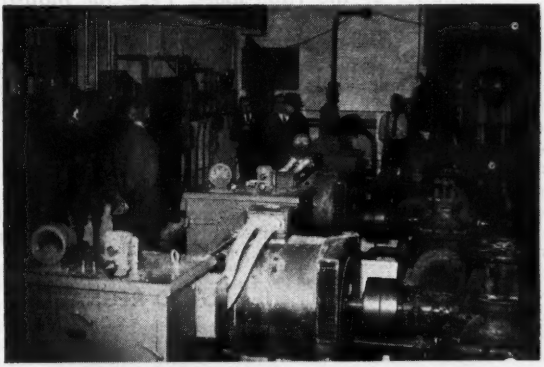
Long Electric Fence

A 20-MILE electrified fence, planned to contain the elephants in the South African Addo National Park and to protect farmers on the fringe of the reserve from damage to their crops, will soon be completed. The plan, approved by the National Parks Board of Trustees, replaces a more ambitious scheme to erect a substantial fence of old railway rails round the 31-mile boundary of the park which would have cost £250,000.

Trafalgar Square Reopened

FLOODLIGHTING AND ILLUMINATED FOUNTAINS

WHEN Trafalgar Square was reopened yesterday by the Duke of Gloucester, who unveiled busts of Admirals of the Fleet Lord Jellicoe and Lord Beatty, two new fountains were officially brought into use. These deal with six times the former volume of water, and each comprises a 1½-in. jet with an 80-ft height of throw surrounded by six ¾-in. jets which cascade into a basin holding 50,000 gal. Water is delivered to the jets by a pump with a duty of 1,400 gallons per minute against a 165-ft head, driven by a 100-h.p. squirrel-cage straight-on-line started motor. The cascade effects can be maintained when the jets are not in use by a second 1,400-gallon pump (140-ft head) driven by an 82-h.p. motor and mechanically interlocked with the first pump to prevent simultaneous operation. Water for the bronze groups at the sides of the basin is provided by a 71-h.p. 1,200 gallons per minute pump (140-ft head). Control is by ironclad fuse switches connected to a bus-bar assembly and divided into power and lighting sections.



Underground substation in Trafalgar Square showing pumps and switchgear

From inspection boxes in steel conduits beneath the pavement are supplied the floodlights for illuminating the fountains in four colours, which fade into one another every 30 seconds. For the outer and centre bowls and the jets 200-W lamps with a beam angle of 34 deg are used in marine heavy-duty fittings. For the top bowl, shallow trough fittings to give a 30- to 40-deg beam of high intensity from 500-W and 1,000-W lamps have been designed by the Ministry of Works. Colour change is effected by 12-kW voltage-regulator transformers (50 to 230 V); a further 12 kW is provided by direct connection, so that the total working load is 24 kW. Trough lighting with a rating of 60 W per ft run is used for the flower beds and spotlight fittings for the shrubbery. The Nelson statue is illuminated by two floodlights with 20-in. reflectors and 4,000-W lamps. Provision is made for B.B.C. requirements for outside broadcasting.

Supply is obtained from the London Electricity Board through a ring-main unit and a 300-kVA 11,000/410-236-V naturally cooled transformer. An alternative low-voltage service has been brought in for lighting the substation. Other apparatus in the substation (which measures 50 ft 9 in. by 15 ft 6 in.) includes a 3-h.p. sump pump to cope with surface water (60 gal per min, 25 ft head) and two ¾-h.p. axial-flow fans for producing four or five air changes per hour.

Educational Films

THE second series of educational films produced by the British Electrical Development Association were shown privately last week in London. These are "The Electric Cleaner," "The Refrigerator," "The Electric Cooker," and "The Electrical Circuit of the House." The films are intended primarily for showing in schools and the commentaries are therefore in simple language which the schoolboy or schoolgirl can readily grasp. The fundamentals of construction are lucidly explained and in the first three films mentioned stress is laid on the correct use and care of the apparatus.

The films run for only ten minutes each, and some of the points may need amplifying to the uninitiated. Any errors of omission are corrected, however, by explanatory notes which are issued with the films for the use of teachers. Although intended for schools the films are suitable for showing to audiences of non-technical adults anxious to learn modern methods of housecraft. They should prove as popular as the earlier E.D.A. films, the demand for which makes it necessary for the Association to have thirty copies of each available. The films are obtainable on free loan by any school or recognized institution or body interested and applications can be made to local showrooms or to Mr. V. W. Dale, general manager and secretary of the Association, at 2, Savoy Hill, London, W.C.2.

Multi-Cylinder Diesels

Advantages of the High-speed Type for Industrial Power Generation

By ALFRED REGNAULD,
B.Sc.(Eng., Lond.), A.R.C.Sc., M.I.E.E.

ACCORDING to British Electricity Authority announcements, the capacity of public supply generating plant is unlikely to equal the electricity demand until 1952. Thus power cuts may be expected during peaks for the next three or four winters, and the problem of producing additional power in industrial establishments is a vital one. Since, because of export trade needs, coal supplies to home industry may also remain restricted for many years, the main source of auxiliary power will be oil, which for economy and other reasons will be burned directly in diesel-engine cylinders rather than in the furnaces of steam generators, except where the latter are already in existence.

Just before the war, largely due to Dr. Ricardo's work in this country, there emerged the high-speed, multiple-cylinder diesel engine. This was developed very rapidly for operating heavy lorries, tanks, armoured vehicles and many types of naval craft, until to-day it is a highly efficient prime mover with a relatively uniform torque on the driving shaft and a very low weight/power ratio. As such, it is of particular value for driving generators of small and medium capacity. Even in establishments generating their own power, expanded production may have fully loaded existing plant, necessitating additional high-speed diesel generators. Indeed, whatever the nature of the existing supply one or more could be installed to meet peak demands without incurring standby losses.

The facility with which a diesel engine can be started up and shut down enables an auxiliary generator to come on the line at any time when the load is excessive and to be cut out when the load is reduced. The unit chosen should not be of too great a capacity since its efficiency falls off considerably when running at less than its designed load. Two small units can generally be more readily installed in an existing power house than one larger unit, as they take up little room and can be tucked into any available spaces. All engine parts being small and interchangeable, spares present no difficulty.

The high-speed, multi-cylinder diesel engine is also extremely useful for running the auxiliary generator in synchronism with the supply from the public mains or from existing steam-turbine driven generators in the works power station. By the use of a large number of cylinders (eight, or even sixteen in the popular V-type engine) in conjunction with high speed of rotation (750 r.p.m. or more), each cylinder develops a relatively low power so that the reciprocating weights are very small and a smooth torque curve is obtained which approaches most nearly to the turbine ideal. The type of engine advocated operates on the two-stroke cycle, which also produces a more uniform torque at the generator shaft.

Where very heavy machinery is installed, particularly if it operates with frequent starts and stops, considerable economies can be effected if the driving motors are supplied from an independent auxiliary diesel generator. The switchgear can be so arranged that when the generator is not required for the purpose it can be connected to the main busbars.

Production Engineering

THE Louis Cassier Co., Ltd., Dorset House, Stamford Street, London, S.E.1, has just published "Production Engineering: Practical Methods of Production Planning and Control," by J. S. Murphy, A.I.I.A. (226 pages, including 99 diagrams and photographs; 12s. 6d., postage 6d. This book is intended for students of production engineering and young planning engineers. Moreover, as methods and systems vary so much in different organizations, there is also in the book much of interest and benefit to experienced production engineers. Treatment of the subject is general rather than particular, and is concerned with basic principles which can be adapted to local conditions as required. No attempt has been made to specialize in any way.

The contents include: Planning a Production Programme; Design for Production; Drawing Office Organization; Process Layout; Manufacturing Processes and Methods; Jigs, Tools and Fixtures; Workshop Layout and Organization; Production Control; Time and Motion Study and Estimating and Costing.

Washing Machine Production

NEW HOOVER ENTERPRISE IN SOUTH WALES

BY opening at Merthyr Tydfil last week a new factory of over 85,000 sq ft floor area, Hoover, Ltd., claims to possess the largest works in Great Britain exclusively devoted to the complete manufacture of electric washing machines. Although the equipment of the factory is still incomplete a weekly output of 2,500 machines is already being achieved and before long this is expected to be doubled.

By selecting Merthyr Tydfil for the site of the factory the company, besides overcoming its labour difficulties, has the satisfaction of contributing to the prosperity of a district which was greatly neglected before the war and at one time had 80 per cent of its insurable population unemployed. To-day the company gives employment to more than 700 workers. Of these 95 per cent are local men and women and 8 per cent are partially disabled ex-miners.

One of the latter, Mr. Daniel Bowen, who suffers from silicosis, performed the ceremony of declaring the factory officially open at a luncheon held on Tuesday last week. After being introduced by the Lord Mayor of Cardiff, Alderman R. G. Robinson, he presented Mr. C. B. Colston, the chairman and managing director of the company, with a golden key as a token of the occasion.

Mr. George Isaacs, M.P., Minister of Labour and National Service, who was present at the ceremony, congratulated the company on its policy of bringing work to the worker and thus not only assisting South Wales in particular but the nation in general. Eventually the factory would employ 940 workers (80 per cent of them men) and a further 100 would be employed at another Hoover factory at Merthyr, nearly completed.

A brief history of the company's new enterprise was given by the chairman, who mentioned that the company would have selling rights for the whole world with the exception of the North American Continent. The machine (fully described in our issue of 14th May) took up little space and it would be within the reach of persons of moderate means. The rate of progress of the factory and its capacity to employ increasing numbers would depend on production efficiency, which in turn depended on a prosperous home market.

The Mayor of Merthyr Tydfil, Councillor C. Stanfield, said the town was deeply appreciative of Hoover's establishment of the factory and the company would meet with the willing co-operation of the townspeople. Sir Harold Webbe (a director) welcomed the visitors and Sir Frederick Bain (president of the F.B.I.) and Col. Sir Gerald Bruce (Lord Lieutenant of Glamorganshire) also spoke.

The factory, the erection of which necessitated the removal of three-quarters of a million tons of coal dust and slag from its eleven-acre site, is planned as a completely self-contained unit and every part of the washing machine is made there. A flow system of production has been adopted; the raw materials enter the factory at one end and the complete washing machines are despatched at the other without back tracking. After being pressed out of sheet metal the various components of the bodies are welded together ready for treatment in a continuous stove enamelling plant. The 1/10-h.p. shaded-pole motors, after assembly and testing, are fitted and wired up and the complete machines go on to a continuous test conveyor. Here the correct amount of water is automatically put into the tubs and the machines are then connected to a system of nine overhead busbars according to the voltage and whether a.c. or d.c. It is thus possible to mix models of different voltages without interfering with the speed of testing. Every machine is run for six or seven minutes at its rated voltage before receiving a flash test of 1,500 V and an insulation test at 500 V. The conveyor can handle one machine every three-quarters of a minute.

Mr. George Isaacs, Mrs. C. B. Colston, Sir Frederick Bain, the Lord Mayor of Cardiff (Alderman R. G. Robinson) and Mr. C. B. Colston at the new Hoover washing machine works at Merthyr Tydfil

Brightness Engineers

MR. R. O. ACKERLEY'S SUGGESTIONS

SOME of the facets of the illuminating engineer's work to-day were examined by Mr. R. O. Ackerley (G.E.C.) in his address as chairman of the Utilization Section of the Institution of Electrical Engineers last week.

The speaker's object was to indicate how ideas about what constituted good lighting practice had changed gradually, not so much in fundamental concepts as in estimation of the relative importance of the different factors involved. Good practice was largely a compromise between conflicting interests; for example, the benefits of higher intensities of illumination must be evaluated against the cost of obtaining it and the difficulties of providing it with comfort.

In illustrating stages in the evolution of practice Mr. Ackerley also showed how appreciation was growing of the fact that lighting, to be good, must create a cheerful atmosphere as well as ease the visual task. Thus illuminating engineers had now become advisers on interior decoration.

Fittings and Surroundings

When, however, they came to prescribe the degree of illumination that informed opinion told them was desirable in industrial and commercial interiors, an entirely new set of difficulties was encountered. The reason was that, as brightness increased, the eye became progressively more susceptible to discomfort from excessive brightness contrasts. That "discomfort glare" was due not only to the contrast between excessively bright objects (lighting fittings) and the general surrounding brightness, but also to the total volume of light that struck the eye; the size and number of fittings also had a direct bearing on comfort. If the fittings brightness were doubled, the field brightness might have to be increased many times to regain tolerable comfort. One could not comfortably double the illumination simply by doubling the brightness of fittings. The effect of increasing the number of fittings was not so severe, though still quite disproportionate to the elevation of general field brightness.

This phenomenon had led to the belief, sometimes voiced, that it was possible to have too much artificial light. This effect was due not to too much light, but to its provision in the wrong way so that visibility and discomfort were both increased.

This critical relationship between the brightnesses of field and fittings had led to the next stage in installation design whereby all visible parts of fittings were toned down to the same apparent brightness as the ceilings behind them, while the total brightness remained comparable with that of the working plane; one of the most effective methods was to use "egg crate" louvres below concealed lamps. In this kind of way, for the first time, the brightness of the working plane could be made to exceed that of anything else within view, thus becoming comparable with daylight conditions.

Thus far had they got, but the next step was already in sight. It was based on further study of brightness contrasts at high values of illumination. The line of approach was to split the field of view into zones so as to determine how the general brightness and contrast within each zone contributed to the total effect.

One saw by brightness contrast, but in the past it had been possible only to approach the problem by manipulating illumination. If the various factors could be properly evaluated, they would go a long way towards turning the illuminating engineer into what he should be, namely, a "brightness" engineer capable of tackling brightness problems direct.

The whole address led up to a piece of special pleading, for illuminating engineering was not necessarily a branch of electrical engineering. Good lighting could be furnished with any suitable source, but for no foreseeable period of time were there likely to be any sources so convenient, flexible and efficient as electric lamps. Therefore, if the electrical profession, as a body, was to prescribe it must also recognise its duty to urge its members to become competent advisers. Mr. Ackerley asked the I.E.E. to pay far more attention to lighting in its education syllabus, to make it possible for a candidate for corporate membership to qualify as an illuminating engineer within his normal period of training, just as he could qualify in any of the recognized branches of the engineering profession.

Cooled-Anode Valves

THE development and design of cooled-anode valves were reviewed by Mr. F. Smith (M.O. Valve Co., Ltd.) in his address last week as chairman of the Radio Section of the Institution of Electrical Engineers. Most of the address was devoted to the main design features of various post-war types of valves and those aspects of the subject which are the main concern of the valve maker, such as types of filaments, cathodes, grids, glass-to-metal joints, forms of seals and convection radiators.

Following some circuit considerations, the chairman indicated how recent developments over the whole range of valves had continued to be chiefly in the direction of delivering more power at higher frequencies and for greater band widths.

Commercial Refrigerators

PRODUCTION OF "COLDRATOR" EQUIPMENT AT LLANDUDNO JUNCTION

THE newly acquired factory of the International Refrigerator Co., Ltd., at Llandudno Junction, is now well in production. The floor area, all of which is comprised in one main floor, is twice as large as the space the company had available at Brixton, this consisting of several small shops which did not lead to economy in plant layout or labour. Part of the London premises has now been given up and the remainder is being used for home and export sales offices and service spares.

It is hoped that eventually the factory will become independent of outside supplies of finished components, with the exception of castings and electric motors, the latter being supplied by an associate company. It is however possible, that foundry facilities may be contemplated at a later date.

The refrigerating equipment manufactured at the factory is marketed under the name of "Coldrator" and covers condensing units from $\frac{1}{8}$ h.p. to 10 h.p., which are applied to equipment ranging from small domestic type cabinets to large commercial and small industrial refrigeration needs.

Many of the smaller units are now being applied to ice-cream storage cabinets which are in production; others are used for "holding" quick frozen foods at temperatures of zero F or below. The medium or larger plants are applied to refrigerated chambers for food storage and other commercial and industrial applications.

In accordance with the general demands of the Government, a proportion of the equipment is being exported and in this connection, for warm climates, it is necessary to carry out tests under tropical or sub-tropical conditions, for which purpose, test equipment is in use for simulating temperatures likely to be experienced.

1. Section of the cabinet assembly showing partly finished cabinets of different types
2. Domestic type cabinets being assembled
3. Final adjustment of 10-h.p. water-cooled condensing unit

Argentine Electrical Imports

THE values in thousands of Argentine dollars (17 equal £1) of some of the chief electrical goods imported into Argentina in 1947 were:—Parts for batteries and accumulators, 3,987 compared with 1,829 in 1947; batteries, 473 (1,428); switches, etc., 17,774 (7,119); lamps, 16,849 (11,217); radio sets, 12,298 (2,372); electricity meters, 4,122 (2,360); underground electric and telephone cable, 12,202 (4,055); other electric and telephone cable, 839 (1,056); motors and dynamos over $\frac{1}{4}$ h.p., 21,184 (6,821); copper wire and cable up to 5 mm. cotton covered 5,548 (1,625); ditto lead covered 3,195 (2,935).

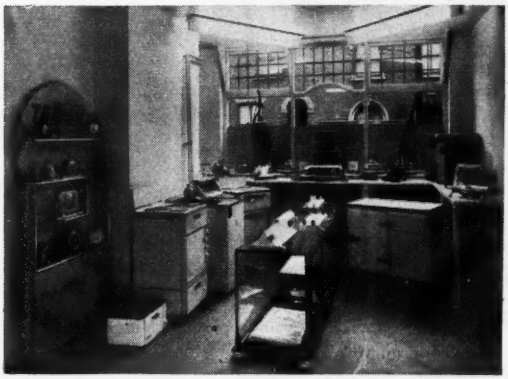
COMMERCE and INDUSTRY

Australian Cable Contracts. Welding Plant Production.

A CONTRACT for what is believed to be the first 66-kV oil-filled cable to be installed anywhere in the British Commonwealth (excluding Great Britain and Canada) has been awarded to Pirelli-General Cable Works, Ltd. The order is for oil-filled cable to link East Perth power station, Australia, to the South Fremantle power station via the Swan River railway bridge, and is to the value of more than £A.60,000. A contract with a value exceeding £A.50,000 has also been secured by the company for the supply of cables to the New South Fremantle power station.

Wholesalers' New Branch

To celebrate the opening of a new branch at 13, Collingdon Street, Luton, the chairman and directors of Young & Wildsmith, Ltd., entertained many of their friends in the electrical manufacturing and contracting side of the industry on 7th October. The branch has been opened to provide increased facilities for customers in the surrounding areas. The company also has branches at Reading and Ilford, and a works at Epping.



Section of the new Luton branch of Young & Wildsmith, Ltd.

Domestic Appliance Exhibition

A special display of domestic electrical appliances was given recently by the British Electrical & Mfg. Co., Ltd., at its showrooms at 26-28, Berners Street, London, W.1, for the benefit of retailers, stores, electricity supply representatives, etc. Besides showing samples of its own products, which include lighting fittings and accessories, the company had on view a wide variety of domestic appliances of several makes, as well as examples of the "GM" fused switches. Among much new apparatus to be seen were a Morphy Richards floor scrubber, the Truvox "Juno" floor polisher, and H.M.V. and "Solachrome" coffee percolators. The company deals direct with the trade only.

New Welding Factory

The new works recently acquired by Petbow, Ltd., are claimed to be the largest in the British Empire devoted to the manufacture of arc welding plant, equipment and electrodes. The site area approaches 70 acres in extent and has about a mile of main road frontage as well as a siding from the Southern Region of British Railways. The power house is equipped with Petbow generating plant, while the water and compressed air are also supplied by Petbow plant. The new factory is Richborough Works, Sandwich, Kent. The company is retaining its works at Balmoral Road, Watford, to which, for the time being, all correspondence should still be addressed.

Small Diesel Engines

To draw attention to the progress that has been made in building up production of the latest range of Petter small diesel engines Associated British Oil Engines, Ltd., held three luncheon parties at the Dorchester Hotel, London, followed by inspection of the new factory established at Staines for the manufacture of these engines on a large scale. At the first of these luncheons which were attended by members of foreign trade delegations and representatives of Government Departments, the Secretary for Overseas Trade, Mr. A. G. Bottomley, said that the great industry to which the company belonged was now producing at the annual rate of £25 million compared with £4 million before the war. Home requirements and particularly those of indirect exports demanded consideration, but the industry had been set a high direct export target of £1·4 million a month, or an annual rate of £17 million.

Mr. Alan P. Good, chairman of the company, said that 58 per cent of production was absorbed by direct exports and a good deal of the remainder went abroad in the form of indirect exports. At present the factory at Staines was turning out 500 lines a week and they were hoping by the end of next year to be producing

not less than 1,500 lines a week. It was the policy of the Group to confine its activities to the production of engines only and thus not to compete with its customers. By specializing it was able to offer the best engines at the lowest cost.

After inspecting the factory the visitors were able to see a special display of industrial and agricultural machinery all powered by Petter engines. Included among this were examples of house lighting sets. Some of the larger engines were also seen driving three 55-kW generating sets with which the factory is equipped.

Cardiff Health Exhibition

The General Electric Co., Ltd., co-operated recently with the Cardiff Corporation in bringing the "Health of the People" Exhibition to South Wales by placing part of its Cardiff Branch premises at the disposal of the organizers. Sections of the ground floor and the showroom at Magnet House, Cardiff, were occupied by the exhibits, while cinema shows were given in a hall upstairs. The exhibition was organized by the Central Office of Information (Wales), and its purpose was to show the progress made in health matters during the past hundred years.

Norway's Four-Year Plan

The draft of a four-year economic plan for Norway which envisages an increase in production of from 15 to 20 per cent, has been presented to the Norwegian Parliament. The plan aims at balancing Norway's overseas trade by 1953 and involves greatly increased investment in industry. It estimates for gross investments totalling 16,816 million crowns in the period 1949-52, including 684 million for electric power supplies. Special emphasis is laid on development of hydro-electric power resources—it is estimated that only 10 per cent of the potential has so far been developed—and the expansion of electro-chemical and electro-metallurgical industries.—*Reuter's Trade Services* (Oslo).

Fire Prevention

The Fire Protection Association has issued a booklet entitled "Fire Prevention Notes for Industrial Premises," which has been specially prepared for industrial organizations. The booklet sets out many of the causes of fires and contains recommendations for their avoidance. There is a section on electrical installations, which draws attention to some of the causes of electrical fires and gives suggestions for their prevention.

Russo-Hungarian Trade

Under the new Hungarian-Soviet trade agreement for 1949, signed recently in Moscow, in addition to raw materials, Russia is to send machine tools, textile machinery and trolley-buses to Hungary and the Russians have agreed to the production in Hungary of the Russian-type trolley-buses for internal needs. In return, Hungary will export to Russia, among other equipment, rail cars (both goods and passenger), locomotives, cranes of all types, and electrical machinery.—*Reuter's Trade Services* (Budapest).

Electric Coffee Stall

Mr. G. K. Jarvis, the proprietor of a coffee stall on the Battersea side of Chelsea Bridge, has gone in for electricity in a big way. The

Electric coffee stall at Battersea Bridge

installation on his coffee stall now includes an electric breakfast cooker, water heater and kettle, and fluorescent lighting. The electricity supply is taken from the mains of the London Electricity Board, by a switch plug and meter in a steel box on the wall behind the stall.

Aircraft Lamps

A document published as B.S.-E. 19 lists the complete range of lamps for aircraft purposes in nine schedules. Each of the latter sets out full details of type of lamp, filament arrangement, bulb, cap, nominal rating and testing requirements. Copies are obtainable for 5s. each, post free, from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Trade with Philippines

From the Export Promotion Department we have received a report on British trade in the Philippines by Dr. Leon Ma. Gonzales, director of the Philippine Bureau of Census and Statistics. Dr. Gonzales says that after 1918 trade between the two territories began to dwindle until in 1935 it was under 8 million pesos (Philippine peso = 50 American cents, say 2s. 6d.). Since the war there has been an improvement but in the first quarter of this year it was still only 0·94 per cent of the total Philippine trade. Imports of electrical machinery and apparatus from the United

Kingdom amounted during the quarter to 48,604 pesos; this compared with 30,888 pesos for the whole of 1947 and 78,918 for 1946.

Dr. Gonzales says that the Philippines have been too much tied to the dollar but "in this country all English commodities have been symbolic of the best . . . if for that consideration alone and no other, it would do us well to cultivate our trade with that nation."

Electricity Output

The output from solid-fuel fired generating stations in the week ended 8th October was 790·5 million kWh, as compared with 754·7 million kWh for the preceding week and 730·1 million for the week ended 10th October, 1947. Stocks of coal at electricity undertakings at 9th October were 4,402,600 tons.

Commercial Travellers' Dinner Dance

The annual dinner dance of the Electrical Trades' Commercial Travellers' Association will be held at the Café Royal, Regent Street, W.1, on 29th October at 6 for 6.30 p.m. Tickets (25s. each) can be obtained from Mr. C. L. Elvy, 26, Greencroft Road, Hounslow, Middx.

E.A.W. Manchester Branch

Dame Caroline Haslett, Director of the Electrical Association for Women, visiting Manchester and Salford Branch on 5th October, told members that, despite electricity shortages, they were better off than in many places abroad. In New South Wales electricity was available for only two or three hours a day. They all knew the frustration which shortages brought. It was up to them to let housewives know how and why these shortages were occurring. One method of showing housewives the effect of peak consumption at danger periods was the organization of guided parties to power stations, which would begin soon. The Lord Mayor of Manchester, Alderman Miss M. L. Kingsmill Jones, presided.

Mr. G. Gibson, chairman of the North Western Electricity Board, said that the Board inherited a "lag" of necessary work on supply equipment amounting to £4,500,000, work that should have been done during the war. They wanted to spend another £10,000,000 in the next five years, not on generating plant, but just on distributing electricity to the consumer. Commenting on the rising demand for electricity, he said that consumption in the area had gone up 9 per cent on last year.

Dame Caroline Haslett addressing the E.A.W. Manchester and Salford Branch

Left to right: Mrs. H. Livesley (Branch chairman), Dame Caroline Haslett, Ald. Miss M. L. Kingsmill Jones (Lord Mayor of Manchester), Mrs. T. H. Hewlett (Lady Mayoress), Mr. G. Gibson (chairman, North Western Electricity Board), Mr. C. T. S. Arnett (controller, B.E.A. North Western Division), Ald. H. E. Rhodes and Mr. J. R. Potts (members, North Western Electricity Board)

New Codes of Practice

The Codes of Practice mentioned in an article which appeared on page 534 of the *Electrical Review* of 1st October are in their final form, not drafts as stated. They embody any suggestions received and adopted by the Codes of Practice Committee as a result of their previous issue as drafts for comment.

U.S. Television Campaign

To counter European competition, mainly British, United States radio manufacturers have made plans for a "comprehensive and aggressive" foreign promotional campaign in support of American television standards and equipment. The campaign will be directed chiefly at Latin America where British television has gained a strong foothold, but attention will be devoted to Asiatic countries, South Africa and Australasia where television has yet to be introduced. Until now American television manufacturers have been wholly preoccupied with the domestic demand for equipment.

Hungarian Foreign Trade Control

Almost all of Hungary's foreign trade will in future be handled through large State concerns under unified Government management, instead of by individual factories or wholesale houses as before. However, some private export-import firms will continue in existence, licensed by the State. The Hungarian State commercial authorities have now compiled a directory, specifically for the benefit of foreign firms, of State-operated foreign commerce concerns with

their addresses and detailed information as to the export-import items handled by them. These concerns include the Hungarian Heavy Industries Foreign Trade Company "NIK," Dorottya-utca 6, Budapest (Cable address: Nikexport, Budapest) which handles the export of electrical machinery, machine tools, water pumps, compressors, ventilators, refrigeration equipment, power plants, ships' power plant, tramcars, trolley-buses, cranes, transporter installations and lifts. The Hungarian Company for the Trade in Technical Products "FER-UNION," Merleg-utca 3, Budapest. (Cable address: Ferunion, Budapest) exports the following items: High-power installation articles, measuring instruments, electrical household appliances, radio and telephone equipment, etc. —*Reuter's Trade Services.*

High-Vacuum Furnaces

An agreement has been made between Birlec, Ltd., Birmingham, and British American Research, Ltd., Glasgow, an associate of National Research Corporation of America, under which the two companies will combine their specialized experiences to design and produce high-vacuum units for such applications as melting, sintering and annealing of all classes of metals whether ferrous or non-ferrous.

Traction Resistors

Towards the end of the article on control gear for trolley-buses which appeared in our 1st October issue there is a reference to the weight of B.T.H. type "RP" resistors which is misleading because the figures were inadvertently interchanged. The corrected statement is that "the 'RP' resistor will weigh only 35 to 40 per cent of the cast grid type and 60 to 70 per cent of other strip resistor types."

Telecommunications in Malaya

Singapore is shortly to become the telecommunications switching centre for the Far East. Early next year, with the arrival of long-range radio transmitting equipment, Malaya will be linked by radio telephone with Europe. The link will be via Nairobi to London and through London's radio telephonic exchange to other European countries. The next step—expected to follow shortly after—will be the establishment of services to the United States and Canada and the rest of the world.

Welding Equipment for Canada

The whole of the resistance welding equipment for the Canadian Austin motor-car factory has been supplied by Sciaky Electric Welding Machines, Ltd., of Slough, who secured the contract in the face of strong competition from both British and American firms. These machines have a nominal electrical rating of 70 kVA and are capable of welding up to two equal thicknesses of 1 in. mild steel plate and are fully automatic in operation. Weld timing is by resistance-capacitance and weld pressure is by pneumatic means, both of which are fully adjustable within an ample range. The welding transformer and control gear are contained within a steel cabinet, which can be suspended from an appropriate gantry in a static position or made mobile by means of a rail and runner system. Water cooled, flexible secondary cables provide manœuvrability.

Electrical Machinery Traders' Dinner

The Association of Electrical Machinery Traders is holding its annual dinner-dance at the Savoy Hotel, London, on Friday, 10th December.

Trade Publications

Eversheds & Vignoles, Ltd., Acton Lane Works, Chiswick, London, W.4.—Technical brochure on remote indication and centralized control systems.

The British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2.—Two priced folders on "Mazdalux" fittings and accessories for 2, 4 and 5 ft fluorescent lamps.

Muirhead & Co., Ltd., Elmers End, Beckenham, Kent.—Illustrated brochure, produced on an unusually large scale, outlining picture-telegraph equipment with indications of the quality of reproduction obtainable, mainly for the information of newspaper staffs.

Daly (Condensers), Ltd., West Lodge Works, The Green, Ealing, London, W.5.—Priced catalogue of electrolytic capacitors for motor starting.

William Geipel, Ltd., 156, Bermondsey Street, London, S.E.1.—Illustrated folder on motor starters, contactor controllers and theatre dimmers.

E. Shipton & Co., Ltd., Ferndown, Northwood Hills, Middlesex.—Catalogue of private automatic telephone systems and accessories.

Thorn Electrical Industries, Ltd., 105, Judd Street, London, W.C.1.—Priced leaflet (AL/40) on twin-tube "Atlas" fluorescent lighting fitting for domestic use.

C. Ryan & Co., 2, Pancras Street, London, W.C.1.—Price list (section E) of 450 sizes of copper and brass tubes.

Inquiries from Chile

H.M. Consul-General at Valparaiso has reported that the Compania de Acero del Pacifico requires a 50 metric ton electric furnace of the Heroult or similar type. United Kingdom firms interested in the inquiry should forward particulars to the Export Promotion Department, Room 1086, Thames House North, Millbank, S.W.1. (Ref. E.P.D. 40774/48.)

Salinas, Fabres y Cia., Ltda., Casilla 1089, Santiago, who wish to get into touch with United Kingdom manufacturers of electric generating plants, have inquiries for diesel and

steam generating plants of from 100 to 5,000 kW, as emergency sets for local factories. It is suggested that interested manufacturers should communicate with the Chilean firm. They are requested to notify the Export Promotion Department of the action taken. (Ref. E.P.D. 19843/47.)

Electrical Manufacture in Canada

The gross factory selling value of products manufactured by the electrical apparatus and supplies industry of Canada in 1947 was $366,506,000 compared with $234,573,000 in 1946, an increase of 56 per cent, according to the Dominion Bureau of Statistics report. The previous highest total was $283,071,000 in 1944. The average number of employees rose from 43,998 in 1946 to 52,736 in 1947, and salary and wages payments from $74,510,000 to $103,891,000.

Trade Announcements

Suflex, Ltd., has opened its new plastic products factory at Risca, near Newport, Monmouthshire. The registered offices have been transferred to 35, Baker Street, London, W.1 (telephone: WELbeck 8323; cables: Suflex, London; telegrams: Suflex, Wesdo, London).

Mr. H. H. Marshall has been appointed as special technical representative to the **Sun Electrical Co., Ltd.,** for East London, Essex and part of Kent. Mr. Marshall will be additional to the commercial representatives already operating in that territory.

Stonor Electrical Wholesalers, Ltd., have moved to 37, Telford Road, New Eltham, London, S.E.9 (telephone: Footscray 4025).

F. H. Wheeler (Sheffield), Ltd., have removed to new premises with showrooms at 117, Woodville Road, Cardiff (telephone: 6526).

The address of **Richard Johnson & Nephew, Ltd.,** is now Bush House, Aldwych, London, W.C.2.

Selectra, Ltd., 42, Selcroft Road, Purley, announces that it is no longer marketing its electric footwarmer through agents but is handling the distribution direct.

Fire Thermostat

The name of the British Thermostat Co.'s electric fire thermostat described in our " Recent Introductions " section last week was incorrectly spelt. It should have been the " Teddington Adaptastat."

Belgian Overseas Trade

Belgium is still more of an importer than exporter of electrical goods. Last year her imports were nearly double those of 1946 and her exports nearly treble. Total Belgian imports of electrical apparatus and parts last year were valued at 2,032·4 million fr. compared with 1,134·5 million in 1946 and 405·3 million average of 1936-1938. Her principal suppliers were the United States, Holland, Great Britain and Switzerland. Exports of such goods were valued at 1,680·9 million fr. against only 555·8 million in 1946 and 392 million average of 1936-1938. Leading customers were Holland, Argentina, Egypt, Brazil, Congo, Sweden and Norway. (176·6 Belgian francs = £).

New Mavor & Coulson Factory

It was reported at Rutherglen Town Council meeting that Mavor & Coulson, Ltd., would be the occupants of the new factory being erected at Rutherglen by Scottish Industrial Estates, Ltd.

East African Trade

THE official statistics of the external trade of Kenya and Uganda for 1947 have just reached this country. Those relating to electrical imports are shown in the following table, with notes of increases or decreases (very few) compared with 1946. There was a small decline in the share of the United Kingdom because of the return of Belgium and Holland in a few lines and the appearance of the Union of South Africa as a competitor.

Class of Goods and Supplying Countries	1947 £ (000)	Inc. or dec. on 1946 £ (000)
Electric wires and cables	140	+ 44
From United Kingdom	119	+ 23
„ *Union of South Africa*	14	+ 14
„ *Belgium*	6	+ 6
Electric lighting accessories and fittings	73	+ 26
From United Kingdom	64	+ 19
„ *Hong Kong*	2	+ 2
„ *Belgium*	2	+ 2
Electrical goods and apparatus, not elsewhere specified	92	+ 78
From United Kingdom	88	+ 76
„ *Union of South Africa*	1	+ 1
Electric light bulbs	20	+ 9
From United Kingdom	15	+ 4
„ *Holland*	4	+ 4
Telegraph and telephone instruments and apparatus	64*	+ 44
Radio sets	63	+ 39
From United Kingdom	54	+ 34
„ *Holland*	6	+ 3
Radio apparatus, other, and parts	20	+ 3
From United Kingdom	15	+ 1
„ *Holland*	3	+ 2
Torches, including bulbs and batteries	31	− 6
From United Kingdom	15	− 10
„ *Union of South Africa*	7	− 6
„ *Hong Kong*	7	+ 7
Generators, motors, convertors, transformers, etc.	80	+ 46
From United Kingdom	74	+ 42
„ *Belgium*	2	+ 2
Small domestic and other electric heating apparatus	14*	+ 3
Other electrical machinery and parts	92	+ 46
From United Kingdom	77	+ 35
„ *United States*	7	+ 5
„ *Belgium*	8	+ 6

* All or mainly from United Kingdom

Domestic Demand Control

AUTOMATIC LIMITING DEVICE

WHILE the present shortage of generating plant has emphasized the need to improve domestic load factors, the situation has also its long-term aspects. The effect has to be considered in relation to the tendency towards the complete electrification of more than ten million homes. Increased tariffs would probably not appreciably lower the demand but would reduce the load factor. Load control systems operated from substations are expensive, and other methods do not necessarily ensure a reduction of demand when most needed.

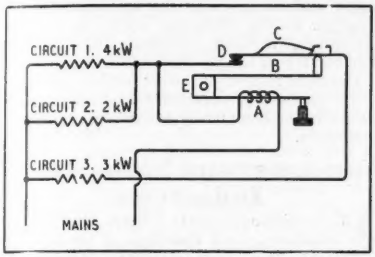


Fig. 1.—Elementary diagram of maximum-demand limiter for reducing current to single appliance

An instrument has been developed by Sunvic Controls, Ltd., for the purpose of improving load factor by automatically reducing a consumer's load at the times of his maximum demand. It allows the consumer a full choice of available appliances but provides that he shall not use them all at the same time. The device consists of two bimetal strips A and B (Fig. 1), one carrying a heater winding and the other compensating for variations in ambient temperature, a snap-action switch C operating a contact D and a pivot E about which the bimetal assembly can rotate. Overall dimensions are 2½ in. square by 2 in. high. The switch opens when more than 15 A passes through the heater winding.

In the example illustrated in Fig. 1, when circuit 3 alone was connected D would remain closed. Connection of the additional kW indicated in circuits 1 and 2 would cause the bimetal strip to bend sufficiently to open the switch and interrupt the current to circuit 3; the bimetal would cool and permit the switch to reclose, maintaining a limited supply up to an aggregate of not more than 6 kW.

Characteristics of a typical suburban installation are given in the table. If no control of space heating is desired only one limiter need be installed, in which case the water heater alone would be disconnected while (but only while) the demand of other apparatus exceeded 6 kW and would absorb any balance of energy up to that limit. Control of the space-heating circuits in addition can be obtained, without interfering with the cooker or lighting, by connecting an appropriate number of limiters in cascade (Fig. 2). These would reduce the load in each circuit progressively as the load on the others increased, so as to maintain the overall maximum demand at 6 kW instead of a probable 11 or 12 or a possible 19 kW, the load factor becoming 15 per cent.

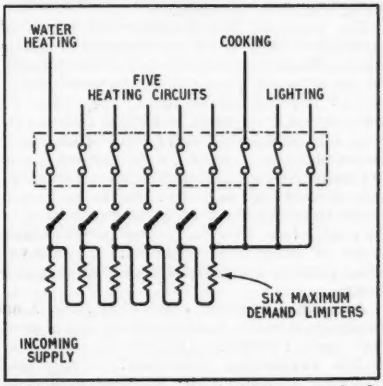


Fig. 2.—Arrangement for multiple control of appliances

If the limiter were used in conjunction with cheaper tariffs the consumer would be encouraged to increase the use of services such as space heating in off-peak periods. The installation in the table with an electric fire as

CHARACTERISTICS OF A TYPICAL SUBURBAN INSTALLATION.

Service	No. of points	kW installed	kW max. demand	kWh per annum	Load factor per cent
Lighting and sundry appliances	12	2·0	0·5	400	9·0
Space heating	5	9·0	5·0	2,000	3.25*
Cooking	1	6·0	4·0	1,400	4·0
Water heating ..	1	2·0	2·0	4,000	23·0
	19	19·0	11·5	7,800	7·1

* The load factor would be increased to 20 per cent for a fire used as the sole means of heating a room

the sole means of heat in one room would then have a load factor of 20 per cent. Such an arrangement from both supplier's and consumer's point of view is a better alternative than a continuation of present restrictions. Economy is wanted only at peak load times and having achieved this the urge should be to develop domestic load to the full.

Electrical Supervisors

Call for Better Recognition

THE status of the supervising engineer and his future were examined by Mr. A. G. Ramsey (Ministry of Works) in his presidential address this week to the Association of Supervising Electrical Engineers.

The president first analysed the causes of anomalies in status and remuneration of certain classes of supervisors and hinted at the remedies. He defined what was meant by the term "supervising" in order to show that in many cases the status of such engineers was much below what was commensurate with their duties and responsibilities. They were vested with authority to carry out responsible work involving the making of decisions. Some employers might challenge the truth of that statement: if they did, then they had either not the right types of supervising engineers, or were not using them to the advantage of their organizations.

As a chief engineer controlling some 2,400 professional and technical staff (of which about 800 were supervising engineers) and about 20,000 engineering industrials, directly and indirectly employed, Mr. Ramsey could claim to have some experience of the many phases of supervising engineers' work with more than a little knowledge of their contributions to results.

He wondered whether some managements had sufficient interest in the spheres of activity of their supervisors and appreciated how they could influence design, production, installation, operation and maintenance to secure the lowest costs.

Proposed Classification

Managements and supervising engineers might both derive some satisfaction and benefit from grouping supervising engineers into a few (four or five) progressive and superannuated grades, each with a definite range of salary with annual increments so as to provide a career of real value, scope and recognizable status.

Mr. Ramsey next considered whether one association embracing all supervising engineers was worthy of consideration. Personally he thought it was and described his proposal in terms of the extension of the existing A.S.E.E. organization, urging its consideration because he felt sure employers and managements would welcome it.

Thirdly, there was need for a greater bond and closer co-operation between professional and technical engineers. There were many cases in which the former, if wise, would bow to the better judgment of the latter and recognize that he might be the key man when it came to practical and detailed application to actual work. Each had his own definite functions, but their work was so interwoven that neither could do without the other. There should be closer co-operation, too, between professional and technical institutions with "two-way traffic" as it were. Consideration might well be given to the acceptance of the A.S.E.E. Swann Diploma, wholly or in part-exemption, towards admission to corporate membership of the professional institutions.

The three suggestions made were not intended to be ideals, but necessities to assure greater service to the community and to the engineering profession.

Consumer and Nationalized Industries

AT Scarborough last Friday Mr. Herbert Morrison, Lord President of the Council, addressed the 52nd Oxford Management Conference (British Institute of Management) on the subject of "The Consumer in Relation to Non-Competitive Industry." He said that in socialized industries the settlement of an equitable price structure as between the different types of consumers was obviously a matter of the highest importance. Broadly speaking, the aim should be to secure a closer relationship than had existed in the past in the case of some statutory monopolies between the cost of each service or product and the price charged for it. Some regard must be paid, however, to the desirability of limiting the charges to particular classes of users in the interests of national economy, and it might be necessary to provide services in certain cases at somewhat uneconomic rates. He was not—at the moment anyway—advocating the complete "postalization" of charges under which electricity, for example, would be provided as cheaply to a remote cottage as to a house next to the power station, but we must go some way in that direction.

The remaining elements of real competition in the socialization field were useful and tonic in their effect, but they must not be allowed to distort the price structure. An industry should not exploit its monopoly position and then use the proceeds to push the competitive side of its business.

The question of consumers' councils was raised during the conference and Mr. Morrison said that there was a danger that too much criticism might produce the impervious thick skin, yet his principal worry was that the consumer would be unvocal. He welcomed a suggestion that to offset the risk of the councils becoming grievance-mongers a social survey might be used to measure how far a service was meeting the particular need.

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

Electric & Musical Industries, Ltd., is paying a dividend of 6 per cent (same), together with a bonus of 2 per cent (nil) on the ordinary stock for the year ended 30th June last. A preliminary statement gives the net profit of the English group of companies as £498,192 (against £117,335 for 1946-47). A sum of £350,000 has been allocated to general reserves of subsidiary companies. The net profit of the parent company was £143,000 (£115,500).

Electrical Components, Ltd.—The chairman (Mr. H. S. Seccombe), in his review accompanying the annual accounts, refers to the company's need for additional finance and states that the directors have under consideration a scheme for the introduction of further capital, which will be laid before shareholders in the near future. Referring to the heavy amount required for taxation, he says that it is too great a drain on the company's resources to enable it build up its capital structure out of profits to meet the requirements of an expanding business.

Morphy-Richards, Ltd.—In a statement issued with the report and accounts, Mr. G. Wansbrough (chairman) says that the trading profit for the year shows a reduction, owing to reduced sales of chimes, heating appliances and vacuum cleaners, partially offset by an increase in the sale of electric irons. The reduction in the sale of chimes is due to reduced spending power; that of heating appliances to stringent control of such production by the Government; and that of vacuum cleaners to delay in the introduction of the company's new vacuum cleaner. Against all these, there has been an increase in the year of 35 per cent in the sales of electric irons. In the home market the company is still able to meet the full demand for electric irons, and for the last year it exported almost 40 per cent of its production of irons. From the Board of Trade returns it appears that the company's exports for the first half of 1948 constituted 46·5 per cent of the total export of electric irons. New products include the "Simon" electric floor scrubber, the first few of which have just been dispatched. The company hopes to deliver the first few thousand of its automatic electric toasters before the end of December, and has already booked orders for more than 35,000.

East African Power & Lighting Co., Ltd.—Progress made with the company's various development schemes was outlined by Major C. M. Taylor, chairman, at the annual meeting in Nairobi last week. In June and July Mr. A. J. Don Small, general manager, visited London for discussions, following which a very comprehensive scheme of hydro-electric and thermal power stations, primary mains and secondary distribution was evolved in consultation with the company's London advisers, for completion between 1949 and 1952. This scheme was much more ambitious than any individual group of developments previously submitted and would involve finance on a considerable scale. The directors were satisfied that the growth of revenue, after allowing for increasing costs of operation, would be adequate to cover this programme.

A resolution was passed increasing the authorized capital of the company from £2,500,000 to £4,500,000 by the creation of 2,000,000 additional 20s. shares.

The Metropolitan Electric Cable & Construction Co., Ltd., has declared an interim dividend of 10 per cent compared with 15 per cent last year when no final dividend was paid.

Aberdare Cables of South Africa, Ltd., proposes to offer 200,000 5s. ordinary shares to existing shareholders (in the proportion of one new to every five shares held) at 10s. 6d. a share. In a circular to shareholders the directors state that the Port Elizabeth factory, now finished, should be in full production of all kinds of cable by the end of the year.

The Revo Electric Co., Ltd., has declared an interim dividend of 5 per cent actual (same), less tax, on the ordinary shares.

Babcock & Wilcox, Ltd., have declared an interim ordinary dividend of 5 per cent (unchanged).

Erinoid, Ltd., is maintaining its dividend for the year at 15 per cent, but this year no bonus is paid (against 5 per cent).

The River Plate Electricity & Other Securities Cpn., Ltd., has announced an interim dividend of 3 per cent (unchanged).

The Telephone & General Trust, Ltd., is again paying an interim dividend of 3 per cent.

New Companies

Troughton & Young (Heating), Ltd.—Registered 8th October. Capital, £25,000. Heating, ventilating, air-conditioning, refrigerating, electrical and general engineers, etc. Subscribers: F. L. Self and F. T. Parker. Solicitors: Slaughter & May, 18, Austin Friars, E.C.2.

North London Ceramics, Ltd.—Registered 11th October. Capital, £5,000. Importers and exporters of, and dealers in, electrical porcelain, ceramic insulators, etc. Directors: R. Brosan, G. Brosan, P. Jones Walton, F. Gevay and J. Mayhew-Sanders. Regd. office: Metrum Works, Edgware Road, N.W.2.

Electro Products (Dundee), Ltd.—Registered in Edinburgh 7th October. Capital, £10,000. Manufacturers of, and wholesale and retail dealers in, electrical fittings and equipment, etc.

Directors: S. A. Stannard and Harriet F. C. Stannard. Regd. office: 30, Stirling Street, Dundee.

Roberts Electricals (Worthing), Ltd.—Registered 9th October. Capital, £3,000. To acquire the business of an electrical engineer and radio dealer carried on by C. W. Roberts at 6, Brighton Road, Worthing. Directors: C. W. Roberts and Mrs. Amy F. Roberts. Solicitor: H. G. Bellamy-Knights, Worthing.

Air-Ray (Engineers), Ltd.—Registered 9th October. Capital, £500. Electrical, refrigerating, ventilating, heating, lighting, radio and general engineers, designers, manufacturers, fitters and repairers of air-conditioning systems, etc. Directors: R. B. Washington and Margaret V. Washington. Regd. office: 21, Copthall Avenue, E.C.2.

Wilkinson Electric Co., Ltd.—Registered 8th October. Capital, £3,000. To acquire the business of an electrical contractor carried on by J. L. R. Wilkinson at Riverside Works, Harlow, Essex. Directors: J. L. R. Wilkinson and Mrs. Doreen W. Wilkinson. Regd. office: 17, Albemarle Street, W.1.

Gwent Electrical Co., Ltd.—Registered 24th September. Capital, £5,000. Electrical engineers and contractors, etc. Directors: E. E. Jones, W. H. Bruce, N. T. James and F. G. Jones. Regd. office: 69, Dock Street, Newport, Mon.

C. Saunders & Co. (Electrical Contractors), Ltd.—Registered 2nd October. Capital, £1,000. Directors: C. Saunders and Ellen Saunders. Regd. office: 36a, Swinegate, Grantham.

D.A.L. (Engineers), Ltd.—Registered 12th October. Capital, £100. Electrical and mechanical engineers, dealers in electrical goods and appliances, etc. Directors: D. A. Lyster and Elizabeth Lyster. Regd. office: 39, Enderley Road, Harrow Weald.

Companies to be Struck Off Register

The names of the following companies will be struck off the Register at the expiration of three months from 12th October unless cause is shown to the contrary:—Leigh Radio Services, Ltd.; Southern Electrical Services, Ltd.

Liquidations

Hackbridge Electric Construction Co., Ltd.—Members' voluntary winding-up. Meeting of members on 12th November at Hersham Lodge, Molesey Road, Hersham, Walton-on-Thames, to receive an account of the winding-up by the liquidator, Mr. R. G. Jones. (This company has been amalgamated in the Hackbridge & Hewittic Electric Co., Ltd.)

New Switchgear Construction Co., Ltd.—Members' voluntary winding-up. Meeting of members on 12th November at Hersham Lodge, Walton-on-Thames, to receive an account of the winding-up by the liquidator, Mr. H. Birch. (This company has been amalgamated in the Hackbridge & Hewittic Electric Co., Ltd.)

Globelite Batteries, Ltd.—Winding up voluntarily. Liquidators, Mr. J. J. Davis, 6, Queensgate Terrace, London, S.W.7, and Mr. A. F. Norman, Parliament Mansions, Victoria Street, London, S.W.1. Particulars of claims to Mr. Norman by 6th November.

Electric Clock Service, Ltd.—Winding up voluntarily. Liquidator: Mr. M. Britz, 134, Fenchurch Street, London, E.C.3.

Bankruptcies

R. A. Squires, 25, St. James's Crescent, Brixton, London, S.W.9, and carrying on business as Radiotois, at 21, Station Road, Brixton, S.W.9, radio engineer and dealer in electrical and radio goods.—Receiving order made 4th October, 1948, on debtor's own petition.

W. E. Williams, electrical and radio engineer, 5b, Winchester Street, Salisbury.—Last day for receiving proofs for dividend 30th October. Trustee: Mr. A. L. Metcalf, 52, Fisherton Street, Salisbury, Official Receiver.

Four-Year Plan

THE American journal *Business Week* reproduced last week a statement made by Sir Stafford Cripps at the meeting of Commonwealth Ministers; it is admitted in London to be "substantially correct." This statement, setting out Great Britain's programme of capital investment and production for the next four years, was prepared for the Organization for European Economic Co-operation for co-ordination with other countries' proposals.

The programme is in twelve sections covering agriculture, coal, steel, engineering, chemicals, shipping, oil refineries, textiles, electricity, railways, housing and tourism. So far as electricity is concerned investment during the four years is put at £400 million and mention is made of 25 new power stations and the extension of 55 plants.

The railway programme is to include electrification schemes "if possible." In the steel industry £150 million is to be spent on new blast furnaces, steel-making plant and rolling mills and on the modernization of present plants. New collieries, underground mechanization, winding equipment, etc., are included in the £120 million expenditure upon the coal mining industry. As regards the engineering industry no definite plan has yet been produced but it is hoped to raise exports of capital goods to "Marshall Aid" countries by 20 per cent. A total of £1,000 million is to be spent on the construction of 800,000 houses if materials (particularly timber) are available.

It has been stated that the figures given by the British Government may be subject to modification when they are co-ordinated with the programmes submitted by the other European countries concerned, a matter which is now being dealt with in Paris.

STOCKS and SHARES

STOCK Exchange markets are being called upon to deal with a volume of business, which, all things considered, is surprisingly active. Apart from the animation which has sprung up from the boomlet in Thomas Tilling shares, British Electric Traction, Cable & Wireless and a few other stocks, a substantial amount of demand is having a hardening influence upon prices of most of the popular shares in the various industrial classes. The electrical manufacturing and equipment groups show decided firmness. Rises greatly outnumber the falls, and, in a good many cases, would-be buyers find it no easy matter to satisfy their requirements.

Week's Price Changes

Anglo-American Telegraph preferred at 115 is 2 points down, Vactrics have gone back to 8s. 9d. and H. J. Baldwin to 9s. 3d. On the other hand, gains are many, and some of the improvements substantial. Tube Investments at 6½ are 5s. higher; Electric Construction at 50s., are 3s. up; Aron, at 50s., show a gain of 2s. 6d. Other rises include Lancashire Dynamo, 5⅛, Henley's, 25s., British Insulated Callenders, 24s., Associated Electrical, 73s. 9d., Walsall Conduits, 55s. 9d., Siemens, 34s. and General Electric, 87s. The radio group is better, with Cossor, 11s., Decca, 22s. 9d. and Plessey, 16s. 3d. In sympathy with the rise in Cable & Wireless ordinary, Globe Telegraphs hardened to 46s. Babcock & Wilcox, 1s. 6d. higher, are 72s. 3d. British Transport 3 per cents reacted to 99⅞ and Electricity Threes to 101⅛, after being 100⅛ and 102⅛ respectively. British Electric Traction deferred holds its ground at 2055, and Tillings remain firm at 120s. 6d.

Cable & Wireless

Cable & Wireless ordinary stock, with a rise on the week of 12⅛, has reached its peak price of 217½, and the prophets are once more busy in their forecasts as to its ultimate future. It seems to be generally expected that the Government's payment for the operating company, will be sufficient to cover the ordinary capital of the holding concern.

E.M.I. Bonus Restored

Market opinion received the annual results of Electric & Musical Industries as excellent in themselves, and all the more creditable because of the recent troubles in radio and allied business. A fourfold increase in the group's net profits, to just short of half a million, is responsible for the restoration of the 2 per cent bonus to the 6 per cent ordinary dividend. This bonus was dropped a year ago after a four-year sequence. Appropriation of £350,000 from profits for the strengthening of the subsidiaries' reserves indicates the modest return which 8 per cent represents on the parent's capital. The actual figures greatly exceed the estimates put out in July at the time of the £2 million note issue. They serve to justify the low yield basis on which the 10s. shares have persistently been quoted. After rising ⅓ this week to 20s., they now pay 4 per cent on the money.

New Capital

Hoover's anticipated issue takes the form of an offer, to stockholders, of new shares at 34s. 6d. The old shares are quoted at 36s. 9d. Electrical Components' chairman refers in the annual report to the need for additional finance, and to early capital proposals for the consideration of shareholders. The 5s. shares stand at 12s. 6d. x.d. Aberdare Cables of South Africa 5s. shares turned dull, at 15s. 6d., on the proposed offer of new shares at 10s. 6d. on a one-for-five basis. A statement estimates that the new Port Elizabeth factory will be in full production of all types of cable by the end of this year. It also refers to the increased cost of the raw materials required to carry out the large volume of orders already received.

Scottish Cables

Since the ordinary and preference shares of Scottish Cables, Ltd., were introduced to the Stock Exchange market last July, there has been investment demand for both classes; the 4s. ordinary shares now stand at 23s. and the £1 4½ per cent preference at about the same price. The latter went ex dividend on Wednesday last week, 13th October, and at the present price the yield on the money comes to £3 18s. 3d. per cent, which in itself testifies to the soundness of the security.

Reference was made here on 2nd April to the North of Scotland Hydro-Electric Board's placing of contracts with Scottish Cables for the manufacture and installation of cables to the value of about £80,000. Upon the shares being introduced to the Stock Exchange market, it was pointed out here, on 6th August, that on the 30 per cent dividend paid on the ordinary capital in each of the past two years, the yield at 24s. would be £5 per cent. The shares are now obtainable at 23s., giving a yield of £5 4s. 4d. per cent.

Aerialite

This company's 1s. shares responded with a rise of 1s. 9d. to the results for the year ended last May, but at 16s. 3d. they still yield 9½ per cent on the total dividend of 150 per cent. These are the first accounts to appear since the company was made public. Profits are above the previous year's, and well ahead of those estimated in the particulars which accompanied the market introduction of the shares. Trading profits of the group, at £169,000, cover the distribution with plenty to spare, after taxation and appropriations. The nominal ordinary capital of only £32,000 is a long way out of line with earning capacity: it is exceeded more than seven times by combined reserves

Electricity Supply

Road Work and Cable-laying. Neasden Boiler Conversion.

Coventry.—GENERATING STATION PROPOSAL.—The proposal of the East Midlands Division of the British Electricity Authority to erect a generating station south of Coventry, for which a site near the Avon at Leek Wootton is being considered, was mentioned at a meeting of the Board of Conservators of the Severn Fishery District at Birmingham on 14th October. The chairman, Sir Chad Woodward, said that as the proposal involved an abstraction of 5,000,000 gal. of water a day, of which 2,000,000 gal. would be returned, it would have a deleterious effect on the river. The Executive Committee of the Fishery Board had passed a resolution that, pending the receipt of more definite details, the Authority should be notified of the Board's opposition to the proposal, and that the views of the Catchment Board and the Warwickshire County Council should be sought.

Gateshead.—CABLE-LAYING AT ROAD CROSSINGS.—The North Eastern Electricity Board has informed the Town Council that in future the Board will not supply earthenware ducts for carrying cables at road crossings on new housing estates. Before the war, it was customary for cables to be laid in virgin ground without ducts before the roads were made. After the war, when cable was difficult to obtain, a tentative arrangement was made whereby road works were allowed to proceed and ducts were supplied by the electricity company to contain the cables when they were obtainable. The borough engineer has informed the Council that the Board's decision means that the Corporation will have to supply and lay ducts at its own expense, or hold up road works until the cable is laid, or leave gaps in the penning so that the Board can trench across in virgin ground to lay the cable. The borough engineer has recommended that the Corporation should supply and lay the ducts itself, and this has been approved as an interim measure. In the meantime, negotiations are to be opened between the Board and the Corporation in an endeavour to reach an amicable agreement.

EXTENSIONS.—The North Eastern Electricity Board is to lay l.v. underground cables in Whitehall Road and Saltwell Road and a 6-kV underground cable to supply Rank's Mill in South Shore Road. Substations are to be erected at Dodd's Dene and at Patewellgate.

North Wales.—QUEENSFERRY STATION SITE.—Seven firms occupying land and premises on the proposed site for an electricity power station at Queensferry are disturbed by the scheme of the British Electricity Authority, which they state contemplates the use of compulsory powers to acquire the site. When the subject was discussed at last week's meeting of the North Wales Development Council, Mr. J. S. Hurford (Board of Trade) said it appeared that if the scheme went through, the premises of three of the firms would be taken, but there would be alternative accommodation for those firms. A sub-committee was appointed to represent the Council in further negotiations.

Scotland.—INSPECTION OF TUMMEL-GARRY PROJECTS.—Over sixty members of the British Electricity Authority and the British Electrical Development Association visited the Tummel-Garry projects of the North of Scotland Hydro-Electric Board at Pitlochry, on 13th October.

WIND-POWER TESTS IN ORKNEYS.—Erection of two 110-ft masts on hills on the Orkney mainland will mark the second stage in the wind tests that have been taking place in the islands. Mr. E. W. Golding, of the British Electrical and Allied Industries Research Association, returned to Orkney on 14th October to continue surveys begun in July and having as their ultimate aim the generation of electricity by wind power.

TRANSPORT

Austria. — RAILWAY ELECTRIFICATION. — The Austrian Federal Railways have drawn up two electrification plans, one a short-term programme aimed at the extension of electric tracks to Linz and Villach respectively, and a long-term project, envisaging the electrification of all other railway lines within the next twelve years. Although it is hoped to carry out the total electrification of the Austrian railway network within twelve years, authoritative opinion is that it will probably take fifteen years.—*Reuter.*

Glasgow.—RAILWAY ELECTRIFICATION PROPOSAL.—Suggestions made in 1922 for the electrification of the city and suburban railways will be revived at an early conference between the planning committee of the Corporation and the British Railways Executive.

Kent. — RAILWAY ELECTRIFICATION. — Sir Eustace Missenden, chairman of the British Railways Executive, said at Folkestone last week that all plans had been completed for the electrification of the line to Folkestone and he hoped the time would not be far distant when they could begin the work.

London.—OIL-FIRED BOILERS AT NEASDEN.—The third boiler to be converted to oil-firing at London Transport's Neasden generating station has recently been put into full commission. This conversion is part of a scheme to reduce coal consumption by converting a total of four boilers from coal to oil burning. It is probable that the fourth will be in service before the end of the year and between them the four boilers are estimated to save 50,000 tons of coal a year.

Accidents Through Negligence

Contractors' Responsibility Towards Customers

By F. E. SUGDEN, A.C.I.S., Barrister-at-Law

IN the supply of electrical fittings and equipment to customers electrical contractors must remember the element of danger which is inherent in some devices more than others. There is a tendency to overlook the fact that most customers possess but limited knowledge of electricity and its uses. It therefore behoves the electrical contractor to explain in detail the operation of these special devices and the dangers, if any, attached to them.

I am prompted to give this warning by the following facts. Recently there was a case in Court in which the seller of an electric tyre vulcanizer demonstrated it without connecting up the earth wire of the flex, or advising the purchaser to connect it when he came to use the machine. This alleged negligence upon the part of the electrician resulted in the death of the purchaser's son who sustained a shock when he operated the vulcanizer.

Purchaser's Justifiable Assumption

The Judge held that the purchaser was entitled to assume that the machine could be used with safety as demonstrated, and that there was no duty upon him to employ an electrician to assist in its operation. The danger of using the machine was not an obvious one, and the fact that although there was an earth wire in the connecting flex it was not brought into use at the demonstration was, in his opinion, equivalent to a declaration, or at least led to a reasonable inference, that an earth connection was not a precaution which was required to be taken before the machine was brought into use.

I am not concerned with the merits or otherwise of the case but purely the legal ruling which will be followed in all other cases of a similar nature. In my submission this decision of the Court is likely to have a far-reaching effect on all electrical contractors. It is made clear that it imposes a duty on the electrical contractor to explain in minute detail the operation of the various types of electrical machines and appliances which he supplies, especially the various safety devices incorporated in them for the protection of users, such as earth connections and cable protection.

In the case quoted the plaintiff obtained damages for loss of his son as a consequence of the alleged negligence of the defendant.

There is a legal phrase "*Caveat emptor*" ("Let the buyer beware") but this does not apply in such circumstances as these. The customer can only be expected to exercise reasonable care in the use of any electrical equipment because obviously he cannot see when a wire is alive. Therefore the Courts will not expect him to beware of the dangers in any electrical equipment which are not obvious to him.

It may be desirable that the contractor or an assistant should supervise the first operation of some appliances on the purchaser's premises. If this course is not adopted it may materially increase the amount of damages awarded against the contractor if an accident occurs. In this connection the contractor should also make sure that the cables or flex which carry the current are so placed, either in the works or in domestic establishments, as not to be a source of danger to the purchaser of equipment. This is as important as making sure that the equipment operates properly.

Library Lighting

AN installation recently completed in the Royal Society of Medicine's Library presented a number of planning problems to the lighting engineers of the British Thomson-Houston Co., Ltd.

It was necessary that the intensity should be such that the title of any book on its shelf could easily be read even at floor level. To achieve this a vertical illumination of the order of 3-4 lumens per sq ft was necessary at floor level, given which it would follow that the horizontal illumination at the reading tables would be adequate; this is, in fact, approximately 18 lumens per sq ft.

General illumination of the library is provided by nine lanterns mounted on the ceiling, each enclosing six "Mazda" 80-W fluorescent lamps, four of which are "daylight" lamps and the other two "warm-white." The lanterns are of wood and glazed in moulded "dew-drop" glass, and are approximately 11 ft long, 2 ft 6 in. wide and 12 in. deep. The fittings were fabricated and erected by E. Pollard & Co., Ltd.

Next Week's Events

Monday, 25th October

BIRMINGHAM.—James Watt Memorial Institute, 6 p.m. I.E.E. South Midland Radio Group. Chairman's address by W. F. Baker.

CARDIFF.—At the South Wales Institute of Engineers, 6 p.m. I.E.E. Western Utilization Group. Address by R.O. Ackerley, chairman of the Utilization Section.

LEWISHAM.—S.E. London Technical College, 8 p.m. A.S.E.E. South East London Branch. "A Study of the Induction Motor," by Brig. F. T. Chapman. Meeting in conjunction with Electrical Engineering Society.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Informal meeting. Discussion on "A Western European Power Network?", opened by the President of the Institution.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. "Load Dispatching and the Reasons for it, with special reference to the British Grid System," by A. R. Cooper.

Tuesday, 26th October

COVENTRY.—Coventry Electric Club. "Silicones," by Mr. Snadow.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Measurements Section. Discussion on "Measurement of Phase Angle of Electric Circuits," opened by A. Glynne.

To 29th October. Olympia. Dairy Show.

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Supply Group. "The Lightning Protection of High-Voltage Transmission and Distribution Systems," by H. M. Lacey.

Wednesday, 27th October

LONDON.—Savoy Place, W.C.2, 6 p.m. I.E.E. Education Discussion Circle. Discussion on "Graphical Approach to RL and RC Circuits," opened by H. E. Dance.

I.E.E. London Students' Section, 2.15 p.m. Visit to Fraser & Chalmers, Erith, Kent.

L.T.R. Headquarters Refreshment Club, 8th Floor, Waterloo Bridge House, S.E.1, 5 p.m. Institution of Post Office Electrical Engineers. Informal meeting. "Investigation of Exchange Maintenance and Service Conditions," by S. E. New.

At the Institution of Civil Engineers, Great George Street, S.W.1, 6 p.m. Institute of Welding. Presidential address by Dr. J. H. Paterson.

To 6th November. Earls Court. International Motor Exhibition.

SALISBURY.—17, New Canal, 6.30 p.m. I.E.E. Southern Centre. "The Application of Electricity to Horticulture," by C. A. Cameron Brown and E. W. Golding.

SCUNTHORPE.—I.E.E. Sheffield Sub-Centre, 6.15 p.m. "The Design and Construction of a New Electron Microscope," by M. E. Haine.

Thursday, 28th October

LONDON.—Connaught Rooms, W.C.2. 12.55 p.m. Batti-Wallahs' Society. Luncheon.

WORCESTER.—Talbot Hotel, 7.15 p.m. Worcester Electric Club. "Railway Signalling Systems," by O. S. Nock.

Friday, 29th October

LONDON.—Storey's Gate, S.W.1, 5.30 p.m. Joint meeting of the I.E.E. and the Institution of Mechanical Engineers. "Some Operating Experiences with High-Pressure Steam Plant," by W. N. C. Clinch.

39, Victoria Street, S.W.1, 6.30 p.m. Junior Institution of Engineers. Films "Precise Measurement for Engineers" and "Electrical Generation."

Café Royal, Regent Street, W.1, 6 for 6.30 p.m. Electrical Trades' Commercial Travellers' Association. Annual dinner dance.

NEWCASTLE-ON-TYNE.—At the Literary and Philosophical Society, 6.15 p.m. North East Coast Institution of Engineers and Shipbuilders. "Thermodynamics in the Making," by S. S. Cook.

Saturday, 30th October

LONDON.—I.E.E. London Students' Section. 11.15 a.m. Visit to Clock Tower (Big Ben), Westminster. 7.30 p.m. Informal dance at Victoria Hall, Bloomsbury Square, W.C.1.

M.V. "Fulham X"

THE motor collier *Fulham X*, built by Hall, Russell & Co., Ltd., for the British Electricity Authority (London Division) has successfully completed speed and power trials on the Firth of Forth. The vessel, which is exactly similar to the *Fulham IX*, recently completed by the associate firm, the Burntisland Shipbuilding Co., Ltd., has a gross tonnage of 1,759 and a net register tonnage of 898. All the deck machinery is electrically driven. An electrically driven steering gear is fitted over the rudder head and is operated by telemotor from the bridge. The masts are arranged to telescope into the hull. Radar equipment, supplied by the Metropolitan-Vickers Electrical Co., Ltd., is fitted, and a Decca Navigator has been installed. Single screw propelling machinery consists of a two-cycle 1,520-b.h.p. diesel engine manufactured by British Polar Engines, Ltd., coupled to a double helical single reduction gear box by means of an electromagnetic slip coupling. The main engines and the three auxiliary diesel engines driving electric generators are fresh water cooled. On the speed trials, which were run in the fully loaded condition, a mean speed of over 12 knots was attained. The vessel will be managed on behalf of the B.E.A. by Stephenson Clarke, Ltd.

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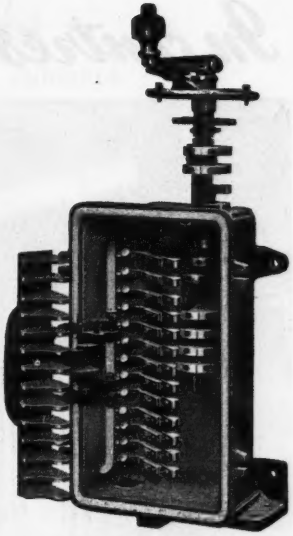

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NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1940

STANDARD Telephones & Cables, Ltd., and E. P. G. Wright (M. den Hertog, in part).—"Telecommunication exchange systems." 10163. 11th June, 1940. (609474.)

Metropolitan-Vickers Electrical Co., Ltd., A. Tustin and D. G. O. Morris.—"Follow-up control systems." 15387. 17th October, 1940. (609204.)

Metropolitan-Vickers Electrical Co., Ltd., and A. Tustin.—"Follow-up control systems." 16261. 8th February, 1941. (Cognate applications 2863/42.) (609291.)

1941

Metropolitan-Vickers Electrical Co., Ltd., A. Tustin and A. Mandl.—"Devices of the kind known as selsyns, and selsyn systems." 822. 21st January, 1941. (609295.)

Metropolitan-Vickers Electrical Co., Ltd., A. Tustin and D. G. O. Morris.—"Control systems for governing the displacements of movable objects or magnitudes of other quantities." 4390. 1st October, 1941. (Cognate application 15438/42.) (609296.)

Metropolitan-Vickers Electrical Co., Ltd., and C. Dannatt.—"Electrical position control systems." 4932. 15th April, 1941. (609297.)

1942

Sperry Gyroscope Co., Inc.—"Electrical apparatus responsive to the phase difference or time lag between two periodic energy waves." 116. 22nd January, 1941. (609298.)

Metropolitan-Vickers Electrical Co., Ltd., A. Tustin and D. G. O. Morris.—"Electrical control systems." 5924. 1st May, 1942. (609303.) "Electrical control systems." 13813. 1st September, 1941. (Cognate application 13692/42.) (Divided out of 609296.) (609304.) "Follow-up control systems." 15437. 1st October, 1941. (Divided out of 609296.) (609305.)

Metropolitan-Vickers Electrical Co., Ltd., and G. H. Fletcher.—"Director or like control systems for guns and the like." 15891. 10th November, 1942. (609306.)

1944

J. C. Templeton.—"Bearings suitable for electrical apparatus and instruments." 2234. 7th February, 1944. (609476.)

British Thomson-Houston Co., Ltd.—"Electric fluid blast switches." 3034. 26th February, 1943. (609207.)

Telefonaktiebolaget L. M. Ericsson.—"Arrangement for fixing a quantity characteristic of a call for example the rate for a call in automatic telephone systems." 7819. 27th April, 1943. (609477.)

British Thomson-Houston Co., Ltd.—"Automatically controlled space heating systems." 11428. 16th June, 1943. (609208.)

Autophon Akt-Ges.—"Calling dials." 14362. 13th September, 1943. (609478.)

Sperry Gyroscope Co., Inc.—"Thermionic means for producing ultra-high-frequency energy." 14874. 21st August, 1943. (609479.)

O. E. H. Klemperer.—"Electron-discharge apparatus in which a flattened or ribbon-shaped electron beam is employed." 18765. 30th September, 1944. (609480.)

1945

British Thomson-Houston Co., Ltd.—"Electric lamp bases and holders." 8856. 12th April, 1944. (609211.)

British Thomson-Houston Co., Ltd., and A. Bowen.—"Flicker shutters for kinematograph projectors." 9980. 20th April, 1945. (609212.)

Standard Telephones & Cables, Ltd.—"Dielectric heating of plastic compositions." 11863. 17th June, 1944. (609310.)

Marconi's Wireless Telegraph Co., Ltd.—"Locked-in oscillator circuits." 30479. 14th November, 1944. (609496.)

Standard Telephones & Cables, Ltd.—"Electron-discharge devices." 32491. 26th June, 1944. (609500.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Circuit arrangements for compensating for potential fluctuations." 33020. 17th September, 1940. (609226.)

Westinghouse Electric International Co.—"Control systems for direct-current motors supplied from a constant current source." 34677. 16th November, 1944. (609227.)

1946

Collins Radio Co.—"Remote control of radio apparatus." 64. 12th January, 1945. (609228.)

Sangamo Weston, Ltd.—"Electrical insulation testing devices." 291. 10th February, 1945. (609506.)

G. S. James.—"Electric wave filter devices." 545. 7th January, 1946. (609231.)

British Thomson-Houston Co., Ltd., and J. R. Kynaston.—"Open type electro-plating barrels." 1376. 15th January, 1946. (609509.)

Western Electric Co., Inc.—"Electrical apparatus including frequency determining tuning means." 3175. 1st February, 1945. (Cognate application 3176/46.) (609511.)

Louvroil-Montbard-Aulnoye.—"Method of electrically heating metal parts." 6948. 16th December, 1939. (609240.)

H. Hesse.—"Electrical apparatus for maintaining constant temperature." 7004. 10th January, 1940. (609517.)

Standard Telephones & Cables, Ltd.—"Pulse translator." 7132. 19th March, 1945. (609519.)

Marconi's Wireless Telegraph Co., Ltd.—"Receivers for phase and frequency modulated waves." 7213. 7th March, 1945. (609520.)

E. L. C. White and W. L. Watton.—"Circuits for correcting the phase of electrical oscillations." 7395. 9th March, 1946. (609258.)

A. Winther.—"Electro-magnetic brakes and clutches." 7428. 27th January, 1945. (609264.)

M. P. Winther.—"Eddy current dynamometers and brakes." 7430. 12th March, 1945. (609265.)

Philips Lamps Ltd.—"Envelopes for electric components." 7435. 26th June, 1941. (609266.) "Remote control devices." 7438. 27th June, 1941. (609267.)

C. L. Faudell.—"Television receivers or the like." 7460. 11th March, 1946. (609524.)

London Midland & Scottish Railway Co., and J. K. Lord.—"Controllers for electric motors driving railway locomotives and locomotive vehicles." 7467. 11th March, 1946. (609271.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Lighting fittings." 7474. 14th March, 1945. (609272.)

Bendix Aviation Corporation.—"Electrical spark-producing apparatus." 7502. 15th March, 1945. (609277.)

Westinghouse Electric International Co.—"Refractory metal tubes." 7505. 10th March, 1945. (609278.)

General Electric Co., Ltd., and E. Gallizia.—"Vapour electric-arc convertors." 7529. 11th March, 1946. (609283.)

British Mechanical Productions, Ltd., and F. C. Fuke.—"Electric plugs incorporating fuse-links." 7579. 11th March, 1946. (609337.)

Marconi's Wireless Telegraph Co., Ltd.—"Oscilloscope apparatus and wave generators suitable for use in radiolocation and other systems." 7588. 27th June, 1942. (609528.)

A. E. Taylor.—"Electric fires combined with or forming part of fire curbs or fenders." 7591. 11th March, 1946. (Cognate application 10199/46.) (609350.)

Plessey Co., Ltd., and F. Kammer.—"Iron cored high-frequency coils." 7637. 12th March, 1946. (609347.)

W. W. Triggs (American Steel & Wire Co. of New Jersey).—"Electric cable." 7654. 12th March, 1946. (609355.)

A. E. Baker.—"Charging equipment for electric accumulators." 7676. 12th March, 1946. (609360.)

British Insulated Callender's Cables, Ltd., and H. E. Kretschmer.—"Electric cables." 7704. 12th March, 1946. (609366.) "Composite tape for electric insulating and other purposes." 7705. 12th March, 1946. (609367.)

Okonite Co.—"Electric cables." 7706. 7th March, 1945. (609368.)

M. M. Oliver.—"Electric time alarms." 7726. 12th March, 1946. (609374.)

Machlett Laboratories, Inc.—"Electrical-discharge device." 7729. 9th May, 1945. (Cognate application 7730/46.) (609376.)

Haseltine Corporation.—"Electric pulse generator." 7737. 8th March, 1945. (609378.)

F. L. Smidth & Co. Aktieselskabet.—"Electrostatic dust-separating filters." 7752. 29th August, 1944. (609386.)

J. W. Tills.—"Apparatus for electrically heating continuously moving fluids." 7776. 13th March, 1946. (609391.)

General Motors Corporation.—"Limit-switch mechanism for electric motors." 7783. 14th March, 1945. (609394.)

Jack & Heintz, Inc.—"Electrical height gauges." 7797. 6th August, 1945. (609534.) "Electrical bore gauge." 7798. 18th August, 1945. (609396.) "Electrical gauging apparatus for testing concentricity and parallelism of grooves in ball races." 7799. 11th September, 1945. (609397.) "Electrical measuring instrument for measuring the radial clearance of ball bearings." 7800. 11th September, 1945. (609398.) "Electrical gauges for measuring ball bearing inner race grooves." 7801. 15th September, 1945. (609399.) "Electrical gauging instrument." 7802. 27th September, 1945. (609400.)

Philips Lamps, Ltd.—"Receivers for carrier signals using pulse-modulation." 7864. 15th March, 1945. (609537.) "Control circuits for X-ray apparatus." 7868. 15th March, 1945. (609414.) "X-ray apparatus for indirect radiography." 7869. 15th March, 1945. (609415.)

British Thomson-Houston Co., Ltd., T. H. Kinman and F. G. Rout.—"Electrical screening arrangements." 7874. 13th March, 1946. (Cognate application 19132/46.) (609417.)

Erg Industrial Corporation, Ltd., and S. F. T. Baldry.—"Electrically heated sad irons." 7906. 13th March, 1946. (609539.)

Precision Developments Co., Ltd., and G. Olah.—"Electric automatic control apparatus, more particularly for machine-tool and similar drives." 7935. 14th March, 1946. (609427.)

C. H. Parsons, Ltd., and G. B. Handley.—"Cord or chain operated electric switches." 8007. 14th March, 1946. (609447.)

C. H. Klyne, J. E. Shaw and H. D. Maclaren.—"Protecting electrical and other apparatus against shock vibrations." 8076. 15th March, 1946. (609461.)

British Pressed Panels, Ltd., and B. H. L. Williams.—"Electric welding." 8079. 15th March, 1946. (609463.)

United States Rubber Co.—"Method of electrolytically removing a dried deposit of a rubber-containing fluid from ferrous metal containers." 8090. 21st March, 1945. (609466.)

United States Rubber Co.—"Insulated electrical conductor." 8093. 8th June, 1945. (609468.)

Automatic Telephone & Electric Co., Ltd., and H. N. Myles.—"Telephone instruments." 8108. 15th March, 1946. (609472.)

Philips Lamps, Ltd.—"Low-frequency amplifying circuits." 8113. 29th July, 1941. (609541.) "Frequency-changers in superheterodyne receivers for very short waves." 8118. 30th July, 1941. (609542.) "Amplifying systems for high frequencies." 8120. 31st July, 1941. (Addition to 544641.) (609543.)

British Thomson-Houston Co., Ltd.—"Dish-washing apparatus." 8162. 15th March, 1945. (609553.)

Claude-General Neon Lights, Ltd., and C. Higgins.—"Caps for electric lamps and discharge devices." 8163. 15th March, 1946. (609554.)

Standard Telephones & Cables, Ltd., and K. E. Everett.—"Electron-discharge devices." 8181. 15th March, 1946. (609557.)

Standard Telephones & Cables, Ltd.—"Communication cables and method of making them." 8185. 30th March, 1945. (609558.) "High-frequency coupling device." 8188. 17th April, 1945. (609559.)

Perivale Clock Manufacturing Co., Ltd., and T. A. Brown.—"Synchronous motor electric clocks and the like." 8204. 16th March, 1946. (609562.)

G. T. Fuery (Etablissements Vitoux.).—"Electro-pneumatic operated machines used for operating tools." 8210. 25th July, 1946. (609564.)

R. C. de Holzer.—"Design of single r.f. coil units which assembled make screened r.f. transformers with variable coupling." 8226. 16th March, 1946. (609380.)

Ferranti, Ltd., and H. Wood.—"Super-regenerative radio receivers." 8251. 16th March, 1946. (609576.)

A. Reyrolle & Co., Ltd., and A. T. Robertson.—"Electric motors and their control." 8293. 18th March, 1946. (609583.)

Westinghouse Electric International Co.—"Fluid blast electric circuit interrupters." 8322. 23rd March, 1945. (609589.)

General Electric Co., Ltd., F. S. Hawkins and A. G. Pearce.—"Photographic flash-bulbs." 8340. 18th March, 1946. (609593.)

British Vacuum Cleaner & Engineering Co., Ltd., H. J. Whiteside and W. A. Robarts.—"Terminal device for electrical apparatus." 8344. 18th March, 1946. (609595.)

C. A. Parsons & Co., Ltd., and D. C. P. Willis.—"Gas turbine plant." 8352. 18th March, 1946. (609596.)

Philips Lamps, Ltd.—"Device for measuring direct voltages." 14029. 6th February, 1942. (609381.)

Amended Specification

C. J. Banwell & ors.—"Radio transmitting and receiving systems." (583743.)

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month from 13th October:—

IONIC. No. B659,576, Class 9. Electric batteries and electric accumulators.—Ionic Alkaline Batteries, Ltd., 9, Great Newport Street, Westminster, London, W.C.2.

CENTURY (design). No. 640,895, Class 9. Sound recording and sound reproducing instruments and apparatus, etc., all being cinematographic instruments and apparatus.—Century Projector Corporation, New York, U.S.A. Address for service: c/o Marks & Clerk, 57-8, Lincoln's Inn Fields, London, W.C.2.

REELEK. No. 651,608, Class 9. Electrical instruments and apparatus included in Class 9.—Reeves Electrical & Radio Co., Ltd., Reelek Works, Pond Lane, Baldock, Herts.

VSE (design). No. B663,619, Class 9. Radio receiving sets (complete), radio gramophones, sound amplifiers, loud speakers, gramophones and gramophone record changing apparatus, and parts of all such goods included in Class 9.—V.S.E. Construction Co., Ltd., 5-7, Denman Street, London, W.1.

HITEX. No. 656,844, Class 10. Arc lamps for use in dental, medical and surgical appliances.—National Carbon Co., Inc., New York, U.S.A. Address for service: c/o Marks & Clerk, 57-8, Lincoln's Inn Fields, London, W.C.2.

REELEK. No. 651,609, Class 11. Electrical instruments, apparatus and installations included in Class 11 for lighting, heating, cooking, refrigerating, drying and ventilating.—Reeves Electrical & Radio Co., Ltd., Reelek Works, Pond Lane, Baldock, Herts.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Argentina.—BUENOS AIRES.—5th November. Sanitary Works Department. Supply of 185 centrifugal electric pumping sets. (E.P.D. 42012/48. Com./1111.)* 8th November. Supply of 630 electric pumps and 630 l.v. screened switchboards with spares and accessories. (E.P.D. 42010/48. Com./1096.)*

Belfast.—30th October. Northern Ireland Hospitals Authority. Electric heating installation in the administrative building, Purdysburn Villa Colony.—Acting administrator, Belfast Mental Hospital.

Oldham.—8th November. Town Council. Laundry plant, comprising four electrically driven rotary washing, boiling and rinsing machines and one hydro extractor.—J. M. Buckley, general superintendent of Baths, Union Street, Oldham.

South Africa.—JOHANNESBURG.—18th November. South African Railways. One 2-ton and one 5-ton overhead electric travelling cranes. (E.P.D. 41876/48. Com./1089.)* 4th November. Electric cable and post insulators. (E.P.D. 41874/48. Com./1095.)*

11th November. South African Post Office. Fuses and carbon blocks for lightning protectors. (E.P.D. 41498/48. Com./1113.)

DURBAN.—7th January. Electricity Department. Electrical testing equipment. (E.P.D. 41493/48. Com./1112.)

BLOEMFONTEIN.—1st December. Electricity Department. High-voltage d.c. cable testing and meter test room equipment. (E.P.D. 41701/48. Com./1116.)

PRETORIA.—11th November. Department of Posts and Telegraphs, Pretoria. 35,500 telephone switchboard cords, of 16 types. (E.P.D. 41875/48. Com./1117.)

Uruguay.—MONTEVIDEO.—Direcion General de Communicaciones. Radio-telephone transmitters and receivers. Closing date for tenders postponed from 9th August to 29th November. (E.P.D. 37540/48. Com./302.)*

* Specifications may be inspected at the Export Promotion Department, Thames House North, Millbank, S.W.1.

Orders Placed

Gateshead.—Corporation. Accepted. Electrical installation at the new Lobley Hill School (£1,918).—Troughton & Young.

London.—L.C.C. Accepted. Electrical installations at schools: Harbinger School, Poplar.—N. Chamberlist. Bell Street School, St. Marylebone.—Alfred Appleby & Co. (Electrical). Peckham Central Boys' School, Montem Street and Tollington Park Central Schools.—David Thomson & Sons (London). Defoe School, Balham.—Electric Contracts (London).

Newcastle-on-Tyne.—City Council. Accepted. 600-kW mercury-arc rectifier for the Raby Street substation (£6,037).—Hackbridge & Hewittic Electric Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Barnwood (Glos).—College of domestic science, Wotton; county architect, Shire Hall, Gloucester.

Bath.—Offices, Denmark Road, Twerton; Thomas Hedley & Co., Ltd., City Road Works, Newcastle-on-Tyne.

Extensions for Bath Foundries, Ltd., Walcot Street; C. A. Crozier Cole, architect, 1, Belmont.

Blackley.—Extensions to works, Crumpsall Vale, for Imperial Chemical Industries, Ltd.; Architects' Department, Hexagon House, Blackley, Manchester, 9.

Boreham Wood.—Primary school, Cowley Hill estate, for Herts. E.C.; C. H. Aslin, county architect.

Bournemouth.—Scheme for four schools, West Howe and Charminster (£700,000); borough engineer, Municipal Offices, Town Hall.

Bradford.—Five day nurseries (£50,500); borough surveyor.

Brigg.—R.C. church and presbytery (£10,000); Rev. T. C. Chapman, St. Mary's, Bigby Street.

Brighton.—Houses (100), Rotherfield Crescent and Norwich Drive; borough engineer.

Cardiff.—Factory for William Lewis, Ltd., 13, Castle Street; Howard Williams & Partners, architects, 2, St. Andrew's Place.

Carlisle.—Office block, Denton Ironworks, Fratchett Bros.; Johnston & Wright, architects, 13, Castle Street.

Castle Donington.—Houses (52) on four sites; McCarthy Collings & Co., architects to R.D.C., 187, Forest Road, Coalville.

Chesterfield.—Additional classrooms, William Rhodes secondary and primary schools; Wilcockson & Cutts, architects, 12, Saltergate.

Chinley.—County college; F. Hamer Crossley, county architect, St. Mary's Gate, Derby.

Crewe.—Extensions to locomotive works for British Railways (£500,000); W. H. Hamlyn, chief architect, London Midland Region headquarters, Watford, Herts.

Doncaster.—Extensions to spinning mills; G. Anderton & Sons, worsted spinners, Wheatley Lane.

Dudley.—Houses (30), Tanlsye Hill estate; Lindleys, builders, Flood Street.

Dundee.—Works extensions; Halley Bros. (Engineering), Ltd., Blinshall Street.

Durham.—Houses (38) for the City Council; E. Jeffcock, Ltd., builders, 107, New Bridge Street, Newcastle-on-Tyne.

Fifeshire.—Hospital for East Fife Hospital Board; Dr. I. Greig, chairman of the Board, Kirkcaldy.

Forfar.—Two blocks of houses for Town Council (electrical); burgh surveyor.

Gateshead.—Five-storey block of flats, Sills Street; H. J. Cook, chief architect to the Council.

Glasgow.—Warehouses in Queen Street and Ingram Street to replace bombed buildings; Arthur & Co.

Gosforth (Northumberland).—Erection of a block of 42 flats on Grange estate for U.D.C.; A. Child, architect, 25, New Bridge Street, Newcastle-on-Tyne.

Grangemouth.—Proposed housing scheme (900 houses); burgh surveyor.

Hetton-le-Hole.—Houses (100) for U.D.C.; P. W. Richardson, surveyor, U.D.C. Offices.

Hexham.—Conversions at Hexham Hydro, for residential college for domestic subjects teachers (£48,000); Northumberland county architect.

Ilford.—Houses (300); borough engineer.

Jarrow-on-Tyne.—Houses (94) for T.C. ; E. Perkins, borough engineer, Town Hall.

Kingston-on-Thames.—Houses (50), Barnfield Avenue; C. H. Coates, Ltd., builders, Davis Road, Surbiton.

Lichfield.—Factory, Trent Valley estate, for International Presswork, Ltd.; Peacock & Bewlay, architects, 83, Colmore Row, Birmingham.

Longbenton.—Electrical wiring of 70 houses for the U.D.C.; A. E. Sweetman, surveyor, Council Offices, Forest Hall.

Maidstone.—Saw mill; J. & A. S. Smythe, Ltd., Bridge Wharf.

Manchester.—Extension to zoological laboratories; T. Worthington & Sons, architects, 178, Oxford Road, Chorlton-upon-Medlock.

Morecambe.—Coach station, Thornton Road; Florence Motors, Ltd., Empire Garage, Alice Street.

Newport (I.O.W.).—County technical college, Hunnyhill (£121,321), for E.C.; Gee, Walker & Slater, Ltd., builders, Brook House, Park Lane, London, W.1.

North Shields.—Factory for Cold Rolling Mills, Ltd., Lime Street, Newcastle-on-Tyne; Johnson & Oliver, Ltd., contractors, Shields Road, Newcastle-on-Tyne.

Otley.—Extensions to works Otley Quarry, Otley Bridge; S. Toulson & Sons, Ltd.

Oxford.—Extensions to works; Wolvercote Paper Mills, Ltd., Mill Road.

Redcar.—Rolling mills, stripper bay, steel plant, scrap gantry and other plant for Dorman, Long & Co., Ltd., Middlesbrough.

Rotherham.—Factory, Fitzwilliam Road, for Disabled Persons Employment Corporation; Hadden Builders, Ltd., 40, Spring Street, Sheffield.

County colleges and primary and secondary schools; E. J. Manson, borough engineer, Municipal Buildings.

Skelton and Brotton.—Houses (325); U.D.C. surveyor.

Stockport.—Educational buildings, Orme's Farm site, Offerton; L. Yates, education architect, Town Hall.

Sunderland.—Offices for William Doxford & Sons, Ltd., Pallion Shipyard (£30,000); Newrick & Blackbell, architects, 24, John Street.

Surbiton.—Houses (40), Fullers Way; Bunting Construction Co., Ltd., builders, 73, Acre Lane, S.W.2.

Sutton-in-Ashfield.—Extensions to works; H. C. Groom & Co., Ltd., Lime Avenue, Huthwaite.

Thatcham.—Houses (82), Bath Road and Northfield Road, for Newbury R.D.C.; E. G. Hampshire, architect, Phœnix House, Bartholomew Street, Newbury.

Tynemouth.—Additions and alterations to offices, Bedford Street, for North Eastern Electricity Board; L. J. Couves & Partners, architects, Carliol House, Newcastle-on-Tyne.

Wallsend.—Reconstruction of factory in Stephenson Street for the Cookson Lead & Antimony Co., Ltd.; A. J. Main & Co., Ltd., contractors, Vincent House, Vincent Square, London, S.W.1.

Warrington.—Houses (72), Dallam Farm and Poplar Avenue sites; J. Y. Hughes, borough surveyor, Municipal Buildings, Bank Park.

Washington.—Houses (30) for the U.D.C.; surveyor.

Weobley.—Additions and alterations to Weobley School, for Herefordshire E.C.; Hiles & Son, contractors, Holme Lacy Road, Hereford.

West Hartlepool.—Houses (114) for T.C.; S. Richmond, borough engineer, Council Offices.

Wye (Kent).—Houses (34), Churchfields; Jackson & Jackson, architects to East Ashford R.D.C., 13, North Street, Ashford.

Educational

A SERIES of six lectures on "Tensor Analysis Applied to Electrical Machines," will be given by Mr. W. J. Gibbs at King's College, Newcastle-on-Tyne, at 5.30 p.m. on Mondays, from 25th October to 29th November. Admission to these lectures is free without ticket.